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THE AGRICULTURAL GAZETTE OF CANADA

Vol. VIII

March-April, 1921

No. 2

STORAGE

LEADING TOPICS

The Financial Benefit of the Work of the Department of
Agriculture

The Special Schools of Agriculture

The Value of Insectivorous Birds to Agriculture

Canadian Egg Laying Contests

Agricultural Education in Secondary Schools

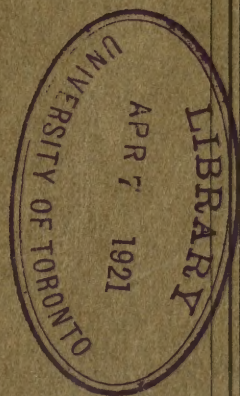
The Home Project Method of Teaching Agriculture

Sunflower Silage

Agricultural Production of Canada, 1920

World's Wheat and Live Stock Situation

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA



The Agricultural Gazette is the official organ of the Department of Agriculture of Canada.

The chief function of The Gazette is to promote and give publicity to the work performed in the interest of Agriculture and Agricultural Education by Departments of Agriculture, both Dominion and Provincial.

The Press is at liberty to reprint any of the articles appearing herein.

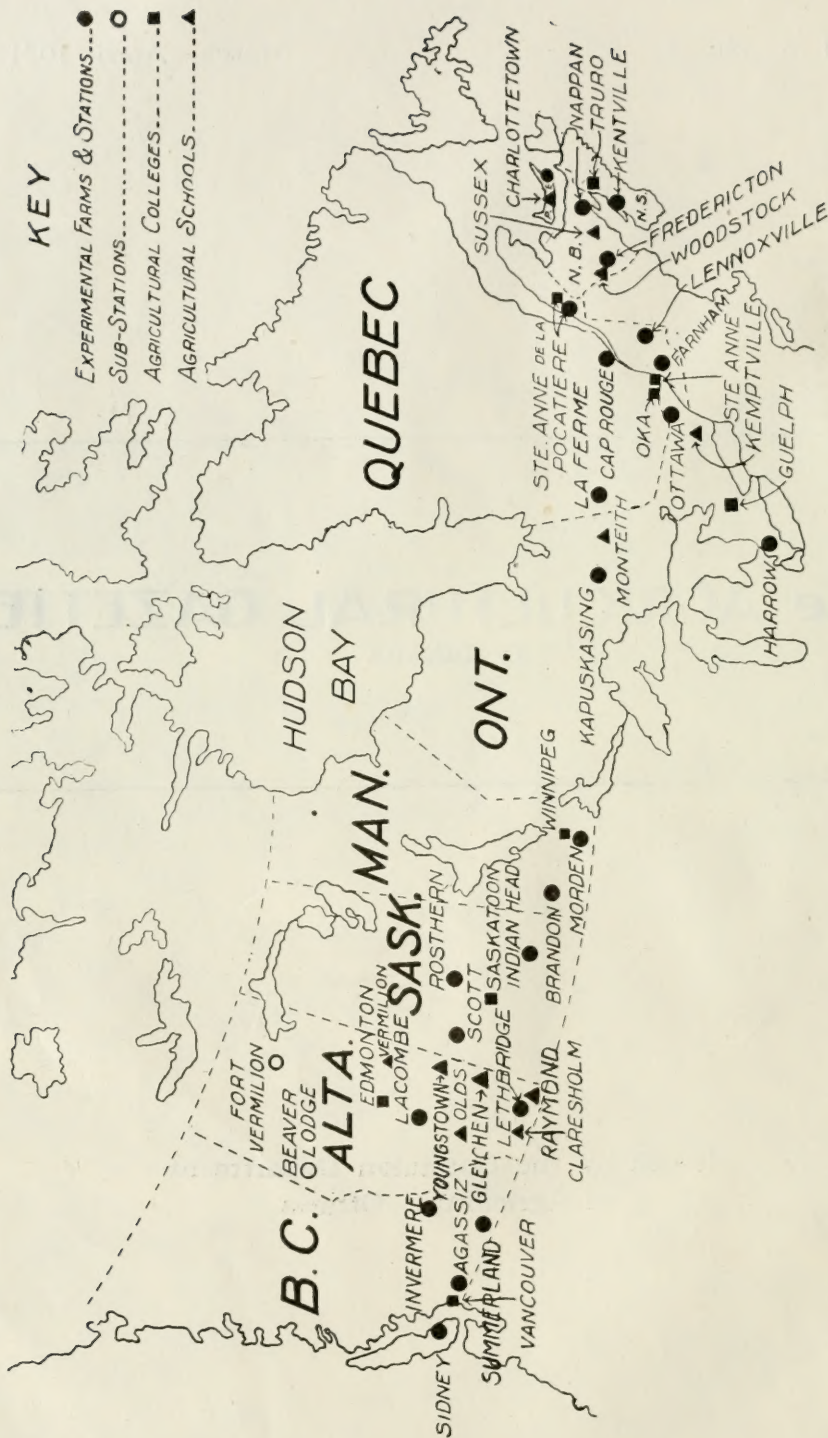
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March—April, 1921

The AGRICULTURAL GAZETTE

OF CANADA

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MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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J. B. SPENCER, B.S.A., Director of Publicity.

EDITORIAL COMMENT

IN four of the Provinces of Canada special Agricultural Schools have been established, designed to give instruction in vocational agriculture of less than college grade to country boys and girls. In this movement Alberta was the pioneer, and has already established six schools offering courses in agriculture and household science.

The school at Kemptville, Ontario, which is similar to the Alberta school in its scope and intention, was formally opened on February 18, although its two year course in agriculture began in the fall of 1920. This school has ample land for farming purposes attached to it, and is well equipped with the necessary school and farm buildings. It is the intention to make it a residential school, and under the able direction of Mr. W. J. Bell, the principal, a career of great usefulness may be predicted. The Kemptville School is being financed entirely from the Federal grant for Agricultural Instruction, and the schools in Alberta and elsewhere have also benefited to a large extent from the same fund.

In Prince Edward Island an agricultural school has recently been opened, while in New Brunswick the Carleton County Vocational School at Woodstock is offering similar courses. The experience in Alberta is that many farm boys and girls can be induced to attend schools of this kind who, for various reasons, cannot avail themselves of the benefits of an agricultural college course. The students are usually recruited from the ranks of those who have left school, and yet realize that they are insufficiently equipped for their life work. Nevertheless, such schools should lead many to take a more advanced course and thus prove a recruiting ground for the agricultural college. The schools referred to are dealt with in detail in this issue of the *Gazette*.

* * *

INSECTS and weeds are among the most formidable rivals with which the farmer has to contend. In Western Canada, in particular, weeds take an increasing toll.

Concerted action has now been agreed upon by the agricultural departments of the three prairie provinces in the operation of a Weed Special train to spread a knowledge of effective control methods.

THE economic value of birds to agriculture, both as regards insects and weeds, is not sufficiently realized. As the natural guardians against destructive insects, they are the farmer's chief ally. Their extermination would soon see mankind at the mercy of the insect world, and they should be protected by every possible means. The instinct to kill the wild things, so persistent in youth, is a survival from primitive man which should be controlled by instruction and enlightenment. The study of bird life in the schools and the formation of bird clubs, both for young people and adults, should accomplish very useful results in this connection.

* * *

THERE are in operation many organizations for the purpose of encouraging the production and use of good seed, and the value of Field Crop Competitions, Seed Centres, Canadian Seed Growers' Association and similar organizations is inestimable. A number of timely articles dealing with this subject will be found in this issue.

* * *

SOME useful and interesting articles will be found in this issue describing what is being done in certain High Schools in Ontario and British Columbia in connection with the teaching of agriculture. In a number of Ontario High Schools special departments of agriculture have been organized, while in the British Columbia schools of this grade agriculture is taught as part of the regular curriculum under the guidance of district supervisors, who are agricultural specialists. The problem facing those responsible for educational policy is to provide adequate educational opportunities for those destined for country life, and this laudable effort to solve it is apparently meeting with a measure of success that is highly encouraging.

* * *

AN important prediction is made by Professor G. H. Hutton, Superintendent of Agriculture for the Canadian Pacific Railway, in his article, Sunflowers for Silage, as to the value of this crop to the stock growers of Western Canada namely, that it will be generally grown for ensilage purposes before many years have passed, and will bring with it millions of dollars of increased wealth. Reports coming to hand state that one rancher is planning to plant one hundred acres to sunflowers, and that another large farmer, who built and filled two silos with this crop in 1920, expects to add five more to his equipment in 1921, all to be filled with sunflowers. These are evidences that the sunflower as a silage crop has arrived or is fast arriving.

* * *

SINCE the settlement, not many years ago, of the Provinces of Saskatchewan and Alberta, great havoc has been wrought by the blowing away of the top soil from the cultivated land. In that comparatively short period, there are areas where the productive surface has been entirely removed through the agency of wind. Unless this devastation is checked, much of the country will in another twenty years be rendered unproductive. The solution of this problem appears to lie largely in the planting of tree belts as wind breaks. That this is being and can be successfully undertaken is apparent from an article appearing in Part IV of this issue which plainly indicates that the problem can be solved by planting in sufficiently wide belts, and by conserving soil moisture. Precipitation is sufficient for tree growth provided the right methods are adapted to retain it. An encouraging feature of the situation is found in the fact that, with settlement, the prevalence of prairie fires is being lessened, thereby permitting

natural forestation to take place by encroachment from the tree-clay areas which bound the prairie country. So long as the prairie was swept by fire from year to year, tree growth could make no progress. Tree bluffs are now making notable headway, but natural methods are too slow to cope with the situation, and must be augmented by the systematic planting if this menace to prairie farming is to be met and overcome.

* * *

IN the current issue of the *Agricultural Gazette* will be found a series of articles describing the system adopted in several of the Provinces in the conduct of Home Projects as part of a course of instruction.

Attention is called to the list of options in agriculture presented to the students at the Chilliwack, B.C., High School. The list indicates that Mr. Readey, the Instructor in Agriculture, is making an earnest attempt to get away from mere play-like projects, and is pursuing the real thing in a thoroughgoing way, having first obtained the backing of the parents and of the boys and girls concerned. The *Gazette* would welcome an expression of opinion from those interested as to the practicability of conducting such high school projects as Mr. Readey has outlined.

* * *

THE Director of the Homemakers' Department of Saskatchewan University, Miss Abbie DeLury, is strongly urging Homemakers' Clubs to hold regularly organized meetings of men and women, boys and girls, for entertainment and instruction, believing that the best results will be attained by men, women and children working together with a common object. As a common meeting ground of interest, singing, reading and bird clubs are recommended. With regard to the latter, it is pointed out that the conservation of bird life in Saskatchewan is very important in the interest of agriculture, as it is elsewhere, and that bird clubs might co-operate with governmental effort towards this end. It is stated in a circular recently issued that children have not the same sense of responsibility when working alone as when working with older people, a view in which leading educational authorities concur.

* * *

THE Commercial Feeding Stuffs Act, passed at the 1920 session of the Dominion Parliament, is now in force, and the Seed Commissioner in an article appearing in this issue of the *Gazette*, outlines the means to be employed to give effect to its provisions. Formerly, the compounder of commercial feeds was not required to make known the constituents of the mixture, and certain brands of stock feeds placed upon the market were found to contain harmful weed seeds and ergotized grain to the great detriment of the health of live stock.

The present Act provides that every sack, bag or other container of feeding stuffs sold or offered for sale must have a tag or label in a conspicuous place on the outside containing the name or brand of the contents, the name of the manufacturer and the name of every ingredient, registered number and the analysis as guaranteed by the manufacturer, which shall show the percentages of the content in protein, fat and fibre.

The regulations made by the Minister, under the Act, give the names of weed seeds known to be injurious, and prohibit their employment in compounding feeds. It is further provided that no feed shall contain over five per cent of weed seeds possessing good feeding value, nor over two per cent of chaff, dust, straw or other fillers. No chopped feed shall contain over one vital, noxious weed seed to the ounce. A copy of the Act will be supplied on request by the Publications Branch of the Dominion Department of Agriculture.

PART I

Dominion Department of Agriculture

THE FINANCIAL BENEFIT TO CANADA OF THE WORK OF THE DEPARTMENT OF AGRICULTURE

A SURVEY of the history of the Federal Department of Agriculture for the past ten or fifteen years reveals many activities which have, directly or indirectly, led to the financial benefit of Canada. Any line of endeavour which has resulted in increasing the output or improving the quality of agricultural products falls within this category, as do all successful efforts to minimize loss from preventable causes, to dispose of such products more profitably or to utilize to better advantage the output of farm, field, and garden. The work carried on by the Department of Agriculture is naturally of so varied a character, and so diverse in its objects, that it is difficult to present the situation in such a manner as to show the total results in the form of money. With some lines it is possible, from official figures, to make a fairly close estimate of the value, in dollars and cents, of some particular policy; but in others—mainly those of a research or preventive character—the results have been in the one case so far-reaching and in the other so successful that it is impossible to give any figures, the correctness of which could be demonstrated.

The work of the Dominion Department of Agriculture may be roughly divided into research, investigation, illustration, assistance, prevention, propaganda, and administration. These lines are to a certain extent interdependent: a new and potentially valuable discovery made in research work is

not of maximum benefit until its possibilities have been thoroughly investigated by experiment, its application demonstrated, and its advantages made known by means of publicity and propaganda.

When considering any one phase of a beneficial discovery or policy made or operated by the department, it is well to remember and give due credit to the other phases of the department's work which have made its maximum application under optimum conditions possible.

Returns from Plant Breeding

As might be surmised, research work has laid the foundation for the introduction of many new plant varieties, for the control and eradication of many destructive live stock and plant diseases, and for the introduction of new and more profitable farming methods, all of which have resulted in direct and, in some cases, enormous gain. Perhaps the most outstanding work of this character has been the production, by cross-breeding and selection, of new varieties of grain. The discovery of Marquis wheat by the Cereal Division of the Experimental Farms Branch, has, during the past five years, meant an average increased income to the wheat growers of the three Prairie Provinces of over \$20,000,000 annually, while careful calculations show that the introduction of Preston, Stanley, and Huron wheats, also Experimental Farm originations, have resulted in an average annual increase

in value of nearly half a million dollars to the wheat crop of the other provinces. The introduction of Victory, Daubeney, and especially Banner oats can be shown to be responsible for an increase of over \$9,000,000 annually, while other new barleys, flax, peas, and other grains are responsible for an annual increase of some \$3,000,000. New varieties, such as Ruby wheat and the Liberty oat, not yet widely distributed, should in the next few years add many millions to the wealth of the country as a result of the department's work.

Similar plant breeding work with orchard and garden crops on the Experimental Farms has led to the discovery of new and valuable varieties of fruits and vegetables, such as the Melba apple, Early Malcolm corn, Alacrité tomato, etc., the value of which, although no accurate estimate can be given, is undoubtedly very considerable. The production by cross-breeding of hardy varieties of tree fruits should also mean a great deal to those districts, especially in the Prairie Provinces, where varieties suited to other climates do not grow to advantage.

Although the breeding work with forage crops is still in its infancy, some valuable discoveries have already been made, notably a perennial red clover, while other new varieties of forage crops have been isolated and fixed which should mean a production at least 15 per cent higher than with those varieties commonly used at present.

Chemistry Investigations

Research work by the Division of Chemistry, upon the value of which, of itself, no definite value can be set, has undoubtedly had far-reaching effects in determining the path followed in other lines of endeavour. Among these may be mentioned the investigations as to the value of clover, alfalfa, and other legumes in the maintenance and increase of soil fertility; an investigation into

the soils of Western Canada; demonstrations of the value of fertilizers; the conservation of soil moisture as affected by cultural methods; and many others too numerous to be mentioned here.

Disease Control in Animals and Plants

In order to discover means of eradication and control for live stock and plant diseases, as well as insect pests, other research work has been carried on by the Health of Animals Branch, the Division of Botany, and the Entomological and Seed Branches. While other agencies, in most cases sub-branches of the same units, have been responsible for the effective application of the control measures thus discovered, the initial value of these control measures can be counted to the credit of research work. For instance, the discovery of the organisms of dourine and the perfection of a laboratory test for this disease have resulted in the disappearance of dourine from Canada, while investigations into the causes of redwater in cattle have also been of great value. As to plant diseases, it is estimated that crops to the value of over sixteen million dollars are saved each year by reason of the preventive measures against smut introduced by the Division of Botany, while another sixteen million dollars are saved annually by control measures for late blight and rot of potatoes and the use of certified potato seed, also introduced by this division. In the Seed Branch, research work in the laboratories has led to the greater utilization of elevator screenings as live stock feed, by the perfection of a system for separating the harmful constituents from the original screenings. This has resulted in approximately 100,000 tons of screenings annually being made of maximum value to the live stock feeder.

Losses from Injurious Insects Lessened

It is estimated that every year the annual losses to our field crops alone,

due to insect depredations, amount to \$125,000,000. This loss would undoubtedly be far greater were it not for the activities of the Entomological Branch. While the larger proportion of the work of this Branch has consisted of the application of control measures, research work aiming at the discovery of better and cheaper insecticides is only one of the many lines of research work carried on. This one item alone should mean the saving of thousands of dollars in the cost of production of the crops affected. Other investigations are being made into the habits and means of control for insects affecting live stock, fruit, grain and forest trees.

Improved Methods of Field Husbandry

Experiments conducted over many years and in all parts of Canada by the Experimental Farms Branch have led to the greater use of crop rotations and the discovery of the best and most profitable rotations for each district. It is estimated that the efforts of the department in this direction are responsible for an increased annual revenue in Ontario alone of about \$32,000,000, while the system of summerfallowing in the prairie provinces, also advocated by this Branch is thought to be responsible for an increased revenue of \$90,000,000 annually.

It would be exceedingly difficult to estimate, with any degree of accuracy, the pecuniary benefits derived by the country from the purely investigational, illustrative and propaganda work of the department, on account of the many varied outside interests that would have to be taken into account, but that this work has a great effect upon production, and consequently upon the financial returns to the country from the agricultural industry there can be no doubt. The chief medium for carrying on investigational work with farm products and farming methods is the Experimental Farms Branch. Some of the work of this branch has been treated above as research work, although even

this latter depends upon experiment and investigation, carried on under ordinary farming conditions, to develop its full usefulness. During the last thirty years, many experiments have been carried on and many investigations made on the Experimental Farms, some of which have served to revolutionize farming methods.

Live Stock and Dairy Development

Consider the work with live stock. To mention only a few instances, the introduction and distribution of pure-bred live stock, the illustrations of the benefits of pure breeding, the grading up of grade flocks and herds by the use of pure-bred sires, and cross-breeding work to combine the desirable qualities of different breeds have all been demonstrated on the farms and the results placed at the disposal of the farming community. If only a small proportion of the advice based on the findings from these experiments has been followed, and there is very good reason to believe that a large proportion of the farmers of this country look to the Experimental Farms for advice on these matters, the annual benefit to the country by reason of the improvement in the stock carried must amount to millions of dollars. Investigations into housing conditions for live stock have led to great improvements in this regard all over Canada, while steer feeding experiments, held year after year on nearly all the Experimental Farms, have indicated the best and most economical methods and feeds to be used. Dairy utensils, milking machines, and other dairying equipment have been tried out and the results of these trials passed on in the form of advice to dairy farmers, while the same may be said of labour-saving equipment, notably the self-feeder for hogs. Valuable work has also been done in the introduction and continual advocacy of record keeping, leading, there is no doubt, to a great saving to the farmers following the method, by pointing out unprofitable members of their herds. Many feeds

have been tried out, and the desirable and undesirable qualities of each discovered, while the Branch has co-operated to a certain extent with the Health of Animals Branch in the trials of various remedial measures for live stock diseases.

Increased Revenue from Poultry

With poultry also much valuable work has been done, the investigation and demonstration of better methods of housing, feeding, incubation and brooding having already led to an estimated increased revenue from the industry of many millions of dollars, while work now being carried on in the investigation of poultry diseases and better housing conditions for poultry will undoubtedly mean several millions more in the course of the next few years.

Flax and Tobacco Stimulated

A good proportion of the increased value and importance accruing to the tobacco industry of this country can be directly credited to the work of the Tobacco Division. By its variety tests, its distribution of seed and its investigations into harvesting and warehousing methods, as well as its surveys of tobacco soils, the tobacco growers of Ontario and Quebec have been shown the best varieties to grow and the best production methods to follow with this crop. A conservative estimate of the value of the services of the Tobacco Division to this industry is about \$3,000,000 annually.

One phase of the work of the Experimental Farms Branch, that of the Flax Division, is worthy of an important place in the consideration of the value of the department's services to the agricultural industry of this country. During the past three or four years, the flax industry, both in connection with fibre and seed, has been growing in importance by leaps and bounds. Much of this improvement can be directly traced to the activities of the department, and it is hoped that future work along this line

will result in the saving of much material, now lost, representing an annual value of millions of dollars.

The work with bees, along the lines of winter feeding, housing, and the discovery of new districts suitable for bees, has also meant a considerable increase in revenue from this source.

Illustration Stations and Exhibits

In communicating its findings to the farming community, the Experimental Farms Branch uses the media of demonstrations, publications, and exhibits. The value of the last two cannot be over-estimated, and in its demonstration work it has, besides the Experimental Farms proper, a number of Illustration Stations scattered all over the country. As a concrete example of the value of these Illustration Stations, one case in particular is cited. Through the example set at one of these stations, farmers in the vicinity have been induced to turn their attention to the growing of a small area of clover seed. In this district the area sown, 850 acres in all, resulted last year in a crop of clover seed worth \$50,000 more than would have been the case with the regular crop.

Promotion Policies

As to those policies of the department under which direct financial or other assistance is given to farmers, it is perhaps more easy to make definite estimates. The chief branch having control of such policies is the Live Stock Branch, and all the policies in operation have for their objective the development of the live stock industry, and the improvement of the quality of live stock carried. One phase of this work is the provision of financial assistance for the procuring of pure-bred male stock to be used in various districts. The effect of this policy has been threefold. Not only has it, by providing pure-bred animals for service, resulted in the production of higher class progeny from grade

females, but it has also brought about the use of more pure-bred males and the holding of larger stocks of good class females by the farmers and stockmen of the districts served. With horses, the increased value to date is estimated at \$400,000; with cattle, \$15,000,000; with swine, \$2,200,000; and with sheep, \$1,000,000, all as a result of this policy.

The Record of Performance work, aiming at proper selection of sires for dairy cattle, has resulted in an increased value in our dairy herds of one and a half million dollars to date, while the operation of the free freight and carlot policies, having as their objective the prevention of sale for slaughter of female stock fit for breeding purposes or unfinished stock, are estimated as being worth \$3,500,000 and \$3,800,000 respectively.

Another line of work that has shown financial results has been the grading and co-operative marketing of wool. Increased prices, varying from four to seventeen cents per pound, have been paid for the graded over the ungraded article, so that it is calculated that the financial benefit from this policy alone during the past five years has been well over \$1,000,000.

By the purchase and distribution of various feeds, such as standard stock feed, corn, oilcake meal, and other mill feeds, as well as by the success of its efforts towards the reduction of freight tariffs on feeds, the Feed Division of the branch has effected a saving to the farmer of over \$500,000, while the Poultry Division considers \$10,000,000 as a fair estimate of the increased value of the poultry industry due to its efforts, by the provision of export and inspection facilities, marketing intelligence, and flock improvement.

Administration of Regulatory and Control Measures

The work of some of the branches of the department consists very largely of the administration of control measures

to prevent losses from disease and other causes. The very character of the work renders it impossible to give any monetary value to the effective administration of these measures. Fortunately, in the past, success has always attended the efforts of the department in preventing or controlling disease, but from the experience of other countries where the regulations have not been so successfully enforced, it is easily seen that the department's inspection service is of untold value. It is only necessary to point to the enviable reputation which many of our Canadian agricultural products have obtained on the export market, and to understand that this reputation largely depends upon efficient inspection in order that this high standard may be maintained, to realize that the value of inspection, in this regard alone, must be enormous.

Canadian live stock has been kept free from foot and mouth disease, pleuro-pneumonia, and other contagious diseases for many years. Glanders, dourine, and anthrax have been practically eradicated, while hog cholera is being kept under control. Tuberculosis and contagious abortion we still have, but measures are being taken to stamp out these diseases, while mange has been isolated in one territory and it is hoped that considerable progress will be made in its eradication this year. The effective quarantine system maintained has prevented the introduction of many live stock diseases into this country.

With plants, efficient inspection and control measures have succeeded in stamping out powdery scab and potato canker, two destructive potato diseases; while the Entomological Branch, by its work in connection with insects, has succeeded in reducing by a large proportion the losses previously sustained annually from this cause.

Somewhat similar work, though of a slightly different character, is the seed inspection service carried on by the Seed Branch. This service has resulted in the use of an ever-increasing proportion

of seed of the first quality and has prevented the sowing in Canada of dirty and non-vital seeds likely to result in the propagation of weeds and resulting deterioration of the crops.

In the Dairy and Cold Storage Branch, the employment of cargo inspectors has undoubtedly resulted in the saving of large quantities of agricultural products, as, mainly owing to the efforts of this Branch, improved facilities have been provided for the shipment under proper conditions of dairy products. The cow-testing work of this Branch may also be mentioned, as it is calculated that, by reason of the propaganda carried on in this connection, the average annual milk yield per cow has been raised from 3,000 to 4,000 pounds. This increase is estimated as being worth at least \$150,000,000 during the past ten years.

The Fruit Branch, by the administration of the Inspection and Sales (Fruit Marks) Act, has been responsible for the prevention of a great deal of loss previously sustained through the improper packing of fruit. It has also given great attention to fruit markets, and by following its advice shippers have been able to obtain much better prices for their fruit. The effective enforcement of this Act has resulted in the standardization of fruit grades, the stabilizing of the fruit market, and the establishment of a better reputation for Canadian fruit products than was previously enjoyed.

Extension and Publicity

The propaganda work of the department is carried on by means of addresses, publications, press articles, demonstrations and exhibitions. The value of this work cannot be over-estimated, as, by

means of at least one of these channels, the department is able to get into touch with every farmer of the Dominion. If only a very small percentage of the information disseminated through these channels falls upon fruitful ground, the harvest reaped therefrom in increased production, reduced waste and better quality product should outweigh the cost a thousandfold.

While a certain portion of the efforts of most of the branches is directed towards the administration of various Acts of Parliament, such as the Animal Contagious Diseases Act, Meat and Canned Foods Act, Live Stock and Live Stock Products Act, Dairy Industry Act, Cold Storage Warehouse Act, Destructive Insect and Pest Act, Seed Control Act, Agricultural Instruction Act and Inspection and Sale Act, each of these has been devised and is being administered in the interests of agriculture, and the efficient administration of each of them results in some phase of the industry being carried on under better conditions, calculated to give better results, and thus increase the revenue returnable to the country at large from this great industry.

To sum up, while certain phases of the work and certain discoveries made by some of the branches of the Department of Agriculture can be shown to be responsible for a definite increase in revenue, the majority of their activities are of such character that it is impossible to make any reasonably correct estimate. The above facts, however, are sufficient to show that the operations and policies of the Department have already been responsible for increased returns to the country of many million of dollars and there is no doubt that, as the years go by, and the activities of the department widen in their scope, this should be increased to billions.

ADMINISTRATION OF THE FEEDING STUFFS ACT, 1920

BY GEORGE H. CLARK, SEED COMMISSIONER, OTTAWA

THE objective of the Feeding Stuffs Act is to establish standards of nomenclature for feeding stuffs and ingredients thereof, and also standards of quality, so far as practicable, for each kind of feed sold in the Canadian market.

Standards to be Established

There are, for instance, nearly eight hundred millers in Canada whose ideas as to what should constitute bran and also shorts or middlings would seem to be highly variable. To establish a standard for these products representatives of the Western Live Stock Union, Eastern Live Stock Union, and the Canadian Dairy Council who serve on the advisory board under the Feeding Stuffs Act, have been requested to meet in conference at Ottawa on February 4th with three representatives of the Canadian National Millers' Association. It is also the purpose of this conference to agree upon type samples of these products, which samples may thereafter be placed in the hands of every Canadian miller and also every seed and feed inspector for his guidance in respect of the observance of the Feeding Stuffs Act.

Organization

For the purpose of administration of the Seed Control Act and Feeding Stuffs Act the territory has been divided into inspection districts, as follows:

1. The Maritime Provinces.
2. The Province of Quebec.
3. Western Quebec, including the counties of Wright, Pontiac, Temiskaming; Eastern Ontario, and Northern Ontario as far west as Lake Nipigon.

4. Western Ontario.
5. Northwestern Ontario and the Provinces of Manitoba and Saskatchewan.
6. The Provinces of Alberta and British Columbia.

The district inspector is in direct charge of the inspection work for each district, and has under his immediate direction from five to nine seed and feed inspectors each allotted to a definite sub-district. These seed and feed inspectors are required to be competent in the technique of both seed and feed inspection.

The administration of these laws is based on the signed statements of official analysts named as such by order of the governor in council on the provisions of the respective acts. A laboratory service for seed inspection is now provided for each of district No. 5 and district No. 6. The laboratory service for all of the districts lying east of Lake Nipigon remains centralized at Ottawa, and an attempt has been made to provide laboratory service for botanical analyses under the Feeding Stuffs Act in the Ottawa laboratory. The service of chemistry analyses is obtained from the laboratory of the chief analyst of the Department of Public Health.

It would seem to be necessary to the efficient administration of these laws to provide laboratory service also for the four inspection districts located east of Lake Nipigon; but for the present it has been deemed quite impracticable to secure competent technical help necessary to the establishment of these laboratories.

THE MARKETING AND DISTRIBUTION OF FRUIT

FROM AN ADDRESS DELIVERED BY C. W. BAXTER, FRUIT COMMISSIONER, OTTAWA, AT
THE ANNUAL MEETING OF NOVA SCOTIA FRUIT GROWERS

IT is doubtful if there are any questions more deserving of the earnest consideration of fruit growers at the present time than marketing and distribution. If the establishing of adequate marketing facilities is necessary to the success of industries whose product is non-perishable and whose output can be increased or decreased in a very short time, is it not essential to the success of the fruit industry—the product of which cannot be curtailed to any extent within several years and cannot be carried over from one season to another—that an equalization of production and distributing facilities be strictly adhered to?

A review of fruit marketing conditions in Canada will show that unsatisfactory results have recurred with each big crop. In years of small crops, when the demand was equal to or greater than the supply, the need for wider markets and centralized marketing organizations was not felt. The bulk of the crop was absorbed within a comparatively small area. When the crop was large or unusual conditions had to be met, there was not sufficient time to look for new markets and a large portion of it was disposed of on a f.o.b. basis and the remainder consigned to the nearest marketing centre. The returns were therefore unprofitable and the resultant conclusion was—overplanting.

In order that any industry may succeed and obtain the best results from the investment, there are four essentials which must be observed: First, the quality of the product should be the best; second, the product should be standardized and maintained; third, the best business ethics should be observed; and fourth, facilities should be provided for securing the widest distribution possible. Advertising for the purpose of increasing consumption is to-

day considered another necessary factor to success, and standardization of a product has been a large factor which contributed to the success of advertising campaigns and in the development of new markets. It is impossible to successfully advertise a commodity unless it has certain desirable characteristics which are uniformly present at all times. Such uniformity and the establishment of brands can be secured only through standardization and concerted action.

It is true that certain grades have been established in Canada by Federal legislation, and while these have done much to advance the industry, they are only minimums but allow considerable scope for individual and concerted enterprise. It is a debatable question whether the adoption of fixed grades would be practical and benefit the fruit industry to any great extent. In the writer's opinion definite grades by legislative enactment are not desirable. Unfortunately there are many packers and some fruit growers' organizations who, in order to avoid an infraction of the law, grade their fruit as close to the minimum as possible. Such a practice evinces a failure to realize that quality is a great factor in the fruit world today, greater, in fact, than at any time in the history of the fruit industry, and that such a practice is unprofitable. While the grading definitions established by law have done much for the industry and may always be necessary, the best results can only be secured by the adoption of definite grades. Although a degree of success has been attained by standardization where grading and packing have been done in orchards or privately owned packing houses, generally speaking, there is an extreme lack of uniformity. The best results have been obtained by entirely eliminating orchard packing and handling the crop

through one management—namely, the central packing house. By this means employees have no incentive to depart from the fixed grades.

In addition to the adoption of fixed grades, it is necessary to observe every care in handling the fruit from the tree to the market to ensure its keeping and prevent loss. In this respect there is much room for improvement in Canada, especially where apples are packed in barrels. If packers had an opportunity of examining their work some weeks after the fruit is packed, they would realize the necessity for greater care.

In the matter of distribution the tendency of individual effort has been towards large centres. This is not to be wondered at, as the cost of developing new markets, entails considerable expenditure and it is out of all proportion to the value of the crop. If the crop is not large there is little or no difficulty in selling on an f.o.b. basis, but when the crop is large there is comparatively little buying, and the only alternative is to consign. Very soon the large centres become overstocked, while others are under-supplied. In order to avoid these unsatisfactory conditions, the area of distribution should be extended and business connections established in every market which is large enough to handle the product in carload lots. The cost to the individual producer of establishing such a system when undertaken by an efficient organization is infinitesimal.

Transportation has become so important a factor in distribution that fruit growers and shippers cannot afford to defer the establishment of the necessary organization to cope with the distribution of the crop. Not only is it desirable that growers and shippers in each province should have such an organization, but these units should co-operate in dealing with the many problems which arise from time to time and are national in character.

In view of the conditions affecting the marketing of the 1920 apple crop, which up to the present have resulted in the

loss of hundreds of thousands of barrels of apples and a weakening market at home and abroad, we might well ask the question: What of the future? Do not these conditions indicate that there has been overplanting? If we look no further than the present crop conditions, we might be justified in coming to this conclusion, but if we look back to 1912 and review conditions from that year up to the present, we have every reason to feel optimistic, provided fruit growers will concentrate their efforts towards stabilizing the industry.

It will be remembered that, generally speaking, the returns from the big crop of 1912 were unprofitable to the grower. Again in 1914 with a big crop and market completely disorganized, growers had further cause to feel discouraged. Planting ceased and orchards were neglected. Then followed the severe winter of 1917-18 that destroyed thousands of trees in Quebec, Ontario, and the Eastern States. These have not been replaced, nor have the plantings since 1914 been sufficient to replace those which have died from general causes. I am not aware that statistics are available to support these statements, but from various estimates which have been obtained, it would appear that as regards apple production, we are where we were 25 years ago. The apparent inclination of consumers to curtail buying is being reflected in the apple market at the present time, and prices have declined. The cost of production, however, has not yet been materially reduced, and it is difficult to forecast what labour conditions will be during the next two years, but the outlook is such as should warrant the expenditure necessary to maintain our orchards in the best condition possible and use every means to produce quality fruit.

If we are to prevent a repetition of the unsatisfactory conditions which have recurred with each big crop, it is essential that there be more co-operation and co-ordination in its marketing and distribution.

THE PRESENT STATUS OF THE DAIRY INDUSTRY OF CANADA

FROM AN ADDRESS DELIVERED AT THE NOVA SCOTIA DAIRYMEN'S CONVENTION BY J. A.
RUDDICK, DAIRY COMMISSIONER

THE extent and volume of the dairy business of Canada is shown by the following figures:—

QUANTITIES AND VALUES OF DIFFERENT DAIRY PRODUCTS IN 1919.

Products.	Quantities.	Values.
Cheese.....	Lbs. 167,734,982	\$44,205,794
Creamery butter.....	" 103,890,707	56,371,985
Dairy butter.....	" 125,000,000	56,250,000
Whey butter.....	" 1,396,814	661,373
Condensed and evaporated milk.....	" 78,006,237	11,214,165
Milk powder.....	" 6,591,099	1,539,272
Sterilized milk.....	" 7,460,400	852,080
Condensed skim milk.....	" 494,973	32,921
Casein.....	" 199,013	32,588
Ice cream.....	Gals. 2,892,974	3,715,488
Cream.....	Lb. B. Fat 6,380,727	4,718,678
Whey cream.....		521,420
Milk, used as milk.....		72,000,000
Total.....		\$252,715,405

"Dairy butter" and "Milk, used as milk" are estimated. All other figures are from the Dominion Bureau of Statistics.

Production is steadily increasing in every province, as is indicated by the increase in the number of cows, and the further fact that the yield per cow has been greatly improved. There has been a tendency in Ontario of late years to divert milk from the cheese factories to

condensed milk and milk powder factories, and the demands of the growing towns and cities for milk, cream, and ice cream, have made further inroads. The war production of condensed milk was greatly in excess of peace time requirements, and the present check to that particular branch of the industry is undoubtedly the result of over production.

Creamery butter production is increasing in every province, as the following tables shows:

CREAMERY BUTTER PRODUCTION IN CANADA

Province	1910	1915	1917	1918	1919
	Lb.	Lb.	Lb.	Lb.	Lb.
Prince Edward Island.....	670,908	539,516	597,271	641,754	905,752
Nova Scotia.....	354,785	1,240,483	1,746,662	1,756,905	2,107,429
New Brunswick.....	849,633	776,416	565,699	660,010	910,504
Quebec.....	41,782,678	36,621,491	34,392,562	36,761,057	37,681,366
Ontario.....	13,876,888	26,414,120	28,714,352	29,397,485	33,903,562
Manitoba.....	2,050,487	5,839,667	7,050,921	8,436,962	8,268,342
Saskatchewan.....	1,548,696	3,811,014	4,220,758	5,009,014	6,622,572
Alberta.....	2,149,121	7,544,148	8,943,971	9,021,765	11,822,890
British Columbia.....	1,206,202	1,204,598	1,294,743	1,581,924	1,668,290
Totals.....	64,489,398	83,991,453	87,526,939	93,266,876	103,890,707

Canada exports only 20 to 25 per cent of her total dairy production. The record for the fiscal year ended March 31, 1920, shows a total value of dairy produce ex-

ported of \$56,398,083, made up of the following quantities and values for different products:—

EXPORTS FOR THE FISCAL YEAR ENDED MARCH 31, 1920.

	Quantities.	Values.
	Lbs.	\$
Butter.....	17,612,603	9,844,359
Cheese.....	126,395,777	36,336,863
Condensed and evaporated milk.....	54,247,498	8,517,771
	Gals.	
Fresh milk.....	1,985,113	576,666
Fresh cream.....	795,780	1,122,424
Totals.....		\$56,398,083

In 1914 the total value of the dairy produce exported amounted to only \$21,193,168. The increase is due largely, of course, to higher prices, but there was also an increase in the quantities of all products except cheese, which shows a slight falling off. Let me say here that altogether too much stress is laid on the fact when there happens to be a decrease in the production or export of any particular product. The making of cheese, butter, or condensed milk is only a means to an end, the end being the best possible return for the milk. It is the total production of milk which is the important thing, and so long as it continues to increase we need not worry about the ups and downs of cheese making, butter making, or any other branch of the industry. Behind any such tendency there is always some very good reason, and there is no immediate probability that any of the well-established branches of the industry will be extinguished or suffer materially by reason of decreased output or export.

At the present time the expansion of the industry, as far as manufactured products are concerned, seems to favour creamery butter making, and there is

very good reason to believe that the present rate of increase in this branch will be maintained or even accelerated. The prairie provinces have great potentialities for butter production.

On the whole one feels justified in saying that the outlook for dairying is just as bright as it ever was. During the war years you were encouraged to produce with the argument that the war prices would prevail longer for dairy produce than for almost any other farm product. The present situation proves that this view was correct.

There is a market for all we can produce in the United Kingdom, and it is the best market in the world. Normally it is practically the only market worth considering.

If we had five or six times as much butter for export to the United Kingdom as we now have our position would be much better than it is with only fifteen or sixteen million pounds to spare. This quantity is too small and too irregular in supply to secure a well established position in the market, like that which our cheese has attained on account of being the largest item in the imports of the Old Country, in addition to the fact that it leads in point of quality.

THE POULTRY WORK OF THE EXPERIMENTAL FARMS

High-producing Strains Being Developed

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN, OTTAWA

AT the Central Experimental Farm, and at practically all the Branch Farms and stations throughout the Dominion, investigations and experiments in connection with poultry keeping are being carried on. The development of high producing strains is one of the chief enterprises. Pedigree breeding is carried on at the Central Farm and at the Branch Farms, and after four or five years of special breeding and selection, we have produced birds and strains of a very high productive capacity. At Kentville, N.S., at the present time, our 11 breeding pens are full of birds that in their pullet year laid average of 197 eggs, the highest bird laying 270 eggs in 52 weeks. It was at this station that one Barred Rock pullet laid 104 eggs in 104 days. At other stations in the Maritime provinces similar work has been done, 256 eggs having been reached at Fredericton. In many sections where a few years ago it was exceptional to get ten or twelve dozen eggs a year from a hen, now there are hundreds that go from 150 to 250.

In Quebec, high production has been obtained. In the Eastern Townships, at Lennoxville, 266 eggs have been reached, a number have gone over the 200 egg mark, while from 150 to 200 is quite a common record.

In the Prairie Provinces, the Experimental Farms have demonstrated that, contrary to the general belief, a prairie climate is not necessarily detrimental to egg production, for in all three provinces, high production has been obtained. Last year Indian Head, with 105 pullets gave an average of 183.7 eggs, the highest being 292 eggs. At Lethbridge,

Alta., the average production has been between two or three times the average of the census returns for 1911.

The province giving the highest production is British Columbia. At the Agassiz Farm seventy miles east of Vancouver, 200 egg hens are quite common, 250 and 270 by no means rare, and at our Vancouver Island Station, a White Wyandotte flock of 200 pullets gave an average of 195.97, 29 of which were about 175 eggs, 82 above 200. There we have reached the high production of 300 eggs a year, for one pullet. At that station no bird is considered worth keeping for breeding if she does not lay 200 eggs the first year, and no cockerel is retained unless his mother laid 250 eggs in her pullet year.

This production need not necessarily be peculiar to Experimental Farms. The average farm is so situated that if it followed pedigree breeding, or even used pedigree males of high producing strains, it should give as good or better production than the Experimental Farms because of the public nature of the latter. High class breeding stock and eggs from our various Farms are available to the public and the public is certainly taking advantage of this opportunity, for the demand for pedigree cockerels is far beyond the supply, and there is no question but that the assistance given by the Farms, and other breeders of high producing strains, will mean much during the next few years in the establishing of higher laying strains throughout the Dominion. It is through the males that increased production is secured and the distribution of bred-to-lay cockerels means a general increase in production.

THE FINCH DAIRY STATION

A Demonstration Plant Combining the Manufacture of Cheese and Butter and the Shipping of Milk and Cream

BY J. A. RUDDICK, DAIRY COMMISSIONER, OTTAWA

PRODUCERS should not in these days be placed in a position of dependence on any single outlet for the disposal of their milk. The ideal arrangement, wherever it is possible, would be to have a receiving depot, preferably under the control of the producers, equipped to manufacture cheese and butter, and in large establishments possibly condensed milk or milk powder, and for the sale of milk or cream. The idea has been tried out at the Finch Dairy Station, operated by the Dominion Dairy Branch, with what success I will leave it with you to judge.

The Station was started in 1912. It is located at the crossing of the Ottawa branch of the New York Central Railway and the Montreal-Toronto line of the C.P.R. The train service is such that the morning's milk or cream can

be delivered by noon in either Montreal or Ottawa. The Station is equipped for the manufacture of butter or cheese and for the shipping of milk or cream, pasteurized or not as may be required, but in either case well cooled. Cheese factories surround the Station on all sides and there is a condensory at Chesterville 10 miles away. That the patrons have been satisfied with the returns is indicated by the fact that the quantity of milk received annually has increased from 2,069,281 pounds in 1912 to 5,570,545 pounds in 1920. I have been informed that not a single individual milk or cream shipment leaves the Finch railway station, although it is well within the area from which supplies are drawn for Montreal and Ottawa.

The following table gives the record for the nine years of operation:—

TABLE 1.

Year	No. of Patrons.	Milk Received.	Net Return to Patrons per 100 lbs.	Total Amount Distributed to Patrons.
		Lbs.	\$ cts.	\$ cts.
1912.....	60	2,069,281	1 11	23,304 49
1913.....	60	2,720,028	1 04	28,214 73
1914.....	64	2,356,202	1 19	28,108 74
1915.....	65	2,418,010	1 35	32,640 85
1916.....	54	2,486,380	1 60	39,779 88
1917.....	65	2,807,885	2 00	56,173 46
1918.....	75	3,859,217	2 14	82,785 69
1919.....	100	5,480,816	2 49	136,540 56
1920.....	112	5,570,545	2 49	138,792 89
		29,768,364		\$566,341 29

It will be noticed that there has been an increase in the number of patrons, especially during the last two years, but these are mostly winter patrons who come in for a few weeks after surrounding factories close. We have not en-

couraged patrons to leave competing factories during the summer months.

The record for 1920 showing the disposal of the milk and rate per 100 paid to patrons month by month may be of interest and help to bring out my point. Here it is:—

THE AGRICULTURAL GAZETTE OF CANADA

Disposal of milk and returns to Patrons by months, Finch Dairy Station, 1920.

TABLE II.

Month.	Cheese lb.	Butter lb.	Milk sold lb.	Fat sold as cream lb.	Return to patrons per 100 pounds.
January.. . . .	.....	.....	153,216	.....	\$3 50
February.. . . .	.....	.....	107,238	1,272	3 22
March.. . . .	.....	.....	94,911	7,316	2 70
April.. . . .	.....	3,441	.....	13,751	2 37
May.. . . .	12,322	483	.....	20,399	2 49
June.. . . .	2,395	.....	.....	30,933	2 38
July.. . . .	33,950	768	.....	13,822	2 24
August.. . . .	15,703	4,736	32,240	9,540	2 28
September.. . . .	5,591	9,258	.....	9,367	2 45
October.. . . .	3,846	1,765	20,000	11,985	2 63
November.. . . .	.....	.....	31,120	10,040	2 72
December.. . . .	.....	.....	.....	8,778	2 70
Totals.. . . .	73,807	20,451	438,725	137,203	....
Average for year.. . . .	.....	.....	.....	.....	2 49
Total milk received.. . . .	.....	.....	5,570,545	.....	.....

In case it may be thought that the patrons of the Finch Station have some special advantages in low manufacturing charges or other bonus let me say that they have none whatever. They get a good service for which they pay full rates. It is a strictly commercial proposition, and any advantage there is in it comes through good business management and being in a position always to sell the product for which there is the best market at the time.

The charges for manufacturing are 2½ cents per pound for cheese and 5 cents for butter; for handling milk 12 cents per hundred pounds is charged and for cream 4 cents per pound of fat.

In operating the station the management makes no lengthy contracts. Prices are determined week by week. The quantity of milk or cream shipped is varied or shipments stopped entirely at a day's notice. Milk distributors can afford to pay and do pay a premium for milk under an arrangement of this kind because they avoid surpluses, on which there is always a loss.

I do not offer this plan as a solution for all the producers' difficulties, or as one suitable for general adoption. I am aware that there are many localities to which it would not be adaptable. I see no reason, however, why it could not be followed in many places where there are good shipping facilities or where milk could be sold to condensories

or powder factories. The condensor at Chesterville has been a good customer of the Finch Station. It is along similar lines that the Fraser Valley (B.C.) Milk Producers are working, and I believe that organization is the most successful of all similar organizations in Canada. •

If a number of establishments like the Finch Station were in operation in Western Ontario they would undoubtedly have a steady influence on the milk situation as a whole.

It is admitted that the most serious aspect of the milk situation in Ontario, which developed when the demand for condensed products fell off last fall, was the closing of the old cheese factories, with their equipment scrapped, even the buildings gone in some instances, the staffs of experienced makers dispersed, and the organization completely broken up.

If I were planning such an establishment, I would make the manufacture of cheese or butter the sheet anchor of the business, and then sell as much milk or cream as I could find a market for at higher prices.

We need never be afraid of serious over-production of either cheese or butter. The market for all we are likely to make is waiting for us, and in the case of cheese at any rate we can command the very top price in the world's markets.

THE VALUE OF INSECTIVOROUS BIRDS TO AGRICULTURE

BY ARTHUR GIBSON, DOMINION ENTOMOLOGIST

THE entomologist in his studies of insects destructive to crops, is frequently amazed at the numbers of insects which are devoured by many of our native birds, particularly during the nesting season. Some birds, as for instance the Chickadee, feed upon insects throughout the year, the insects constituting as high as 95 per cent of their food. The United States Biological Survey have, for many years, devoted much attention to the feeding habits of birds and in the investigations conducted thousands of bird stomachs have been examined. Little of such work, comparatively, has as yet been accomplished in Canada.

The annual loss in Canada to field, orchard and garden crops, due to destructive insects, is on a conservative estimate, upwards of \$200,000,000. To this huge devastation must be added the enormous annual destruction caused by forest insects, stored product insects, etc. It is certain that these losses would be very much greater if it were not for our insectivorous birds.

Mr. Norman Criddle, Entomologist, in charge of the Entomological Laboratory at Treesbank, Manitoba, has for a number of years made special observations on the feeding habits of certain birds, chiefly in the vicinity of his home near Treesbank. One or two of his most striking statements are worthy of mentioning here. He records that in June, 1918, the food of one brood of young prairie horned-larks consisted largely of cutworms which the parent birds searched for in the soil. It was estimated that 400 cutworms were consumed in one day, and such feeding would probably continue for a period of 10 or 12 days. When it is realized that the horned-larks are among the most abundant of our western ground

birds, these figures cannot fail to impress one of the value of these birds in devouring enormous numbers of insects. C. W. Nash, of Toronto, records the robin as an active cutworm destroyer. One young robin kept in confinement ate 165 cutworms in a day. Had it not been confined, the probability is it would not have found so many cutworms, but the experiment indicates the quantity of insect food required for the proper growth of such young birds.

During the past few years grasshoppers have caused important losses in grain-growing districts in Western Canada. Birds have been observed to devour large numbers of young hoppers. Mr. Criddle has informed me that crows, grouse and gulls were particularly useful. Regarding the crow the economic status of which has been questioned, evidence certainly proves that the food of this bird consists very largely of insects during the breeding season. According to Mr. Criddle, a family of six crows are capable of consuming three bushels of grasshoppers in one season, which quantity would approximate 1,242,000 individuals. Imagine the capability of large flocks of these birds! In certain places in Manitoba areas of growing grain have been actually saved from destruction by grasshoppers, owing to the presence of large flocks of gulls which fed actively upon the insects.

In British Columbia in certain sections birds have been of undoubted aid in controlling the Spruce Budworm, a destructive pest of balsam and spruce trees. Messrs. J. D. Tothill and A. B. Baird, of the Entomological Branch, have noted in this connection, the Red-breasted Nuthatch, the Western Tanager, the Myrtle Warbler, the Chickadee, as well as a number of other birds. While our insectivorous birds reduce to

an important degree outbreaks of injurious insects, they are not unfortunately able to distinguish between the destructive and the useful kinds of insects and undoubtedly large numbers of the latter are freely eaten. It is, therefore, not always easy to accurately determine the exact economic status of many of our birds.

The value of protecting our useful birds is every year becoming more widely recognized by farmers, fruit-growers and others. Not only do they aid us in destroying enormous numbers of injurious insects, but many of them feed largely upon seeds of weeds. The various sparrows, for instance, are typical weed seed eaters. In the state of Iowa, it has been estimated that tree sparrows annually eat approximately 875 tons of weed seeds. As the late Dr. C. Gordon Hewitt pointed out, however, "the weed destroying power of graminivorous birds may be exaggerated if the question is

not investigated with great thoroughness, for while the powerful gizzards of some birds may grind up the hardest coated seeds, in other cases seeds may be capable of germination after passing through the digestive tract, as Collinge has shown in a number of cases in English birds."

The protection of migratory birds by the passing of the Migratory Birds Convention Act has in the United States, resulted in a total return in actual food value to hunters of more than \$20,000,000. The passage and enforcement of the above Act has also been of great service to Canada, but as far as the writer knows there are no figures comparable to the above.

Not only do our wild birds assist us very materially in our fight against injurious insects, but they also charm us with their delightful appearance and their ever pleasing songs. It is the duty of all citizens to aid at all times in their protection.

COMBINED SEED CROP AND CLEANED SEED COMPETITIONS

BY GRANT S. PEART, CHIEF, MARKETS DIVISION, SEED BRANCH

ONE phase of the work of the Seed Branch is to promote greater production of good seed in Canada. This is being done through three chief channels; first, by supporting the Canadian Seed Growers' Association in its work of producing registered seed; second, through providing a service of markets intelligence to growers and, third, by payment of cash subventions to the Departments of Agriculture of each of the provinces to encourage seed production. The money paid the provinces is used to pay prizes awarded in Standing Field Crop Competitions, Seed Fairs, Provincial Seed Exhibitions, and Combined Seed Crop and Cleaned Seed Competitions. Most Canadians who are interested in the

seed question will be already thoroughly acquainted with these competitions, with the exception of the last one named, the Combined Seed Crop and Cleaned Seed Competition. This competition is of recent introduction to the Seed Branch subvention agreement with the provinces, and it is my purpose here to give a brief outline concerning its form, purpose and application.

In form it has two distinct phases. The first consists of a Standing Field Crop Competition, and, in the second phase, a Threshed and Cleaned Seed Competition is held in which the seed produced from the fields of the first phase is judged in the granaries of the

competitors, after threshing is completed. The cash prizes awarded depend on the combined scores of both phases and awards are based 65% on the bin score and 35% on the field score. The cleaned seed part of these competitions is recognized, therefore, as the more important. This feature applies to all seed crops used, with the exception of potatoes, in which case the basis of making awards is reversed, namely, 35% on the bin score and 65% on the field score. These competitions must have at least fifteen entries in each and the foundation seed used by competitors must be of approved origin, which is registered seed or seed approved by the seed committee of the province in which the competition is organized. The minimum quantities of cleaned seed ready for market, which competitors must be prepared to submit to the judges in order to qualify for awards, are as follows:—

Wheat.. . . .	150 bushels.
Barley.. . . .	100 "
Oats.. . . .	200 "
Peas.. . . .	100 "
Buckwheat.. . . .	100 "
Corn.. . . .	100 "
Field beans.. . . .	25 "
Clovers and Timothy.. . . .	15 "
Potatoes.. . . .	150 "

According to the Seed Branch agreement with the provinces, all agricultural associations (not necessarily Agricultural Societies) are eligible to conduct these competitions, provided that during the same season the agricultural association does not conduct a Field Crop Competition with the same kind of crop. The amount of money available for prizes in each competition by virtue of the subvention agreement, is \$200, which needs to be supplemented by the province with an additional \$100. When the total amount available is not awarded, the amount of the subvention paid is two-thirds of the cash prizes awarded in the competition, the province paying the other one-third.

The primary purpose of the Combined Seed Crop and Cleaned Seed Competition is to encourage the development of commercial seed centres, as are being promoted by the Canadian Seed Growers' Association and other seed growers' associations of the country. The demand for superior quality seed of recognized breeding has grown very materially during the past few years, until the normal supply has been more than overtaken by the demand. Particularly is this the case in the matter of seed grain in car-lot quantities. This demand comes, for the most part, from the seed trade and farmers' organizations, which, because superior seed grain in car-lots has not been available, have resorted to seed supply of unknown breeding and indifferent quality in order to supply the country's needs. The commercial seed centre would be expected to supply these needs with registered seed grain. It may be well to point out that the Field Crop Competitions were not designed to serve the foregoing purpose, but they have paved the way for the application of the Combined Seed Crop and Cleaned Seed Competitions and the development of seed centres, because they have clearly indicated those sections in each of the provinces where commercial seed centres might be established, founded on economic principles of seed production and marketing; in other words, that seed growing would be a profitable enterprise in certain districts. This information naturally is essential in promoting the production of special kinds of seed in different localities, for the foundation of the seed centre idea is whether seed production in a given district would be profitable to the growers and worthy of development.

Those districts in which agricultural associations elect to conduct this form of competition will need to be especially adapted to the production of seed of the kind of crop that is used in the competition and the crop must be a general one throughout the district,

otherwise difficulty will be experienced in procuring sufficient entries and complying with the quantities of cleaned seed required by the regulations.

It is expected that the Field Crop Competitions will be continued in most localities of the country and serve their purpose of creating local seed supply, but that special districts, suitable for seed centre development, will take up the other form of competition.

The principle of the Combined Seed Crop and Cleaned Seed Competition was first conceived in the Province of Quebec and put into effect there for the first time in 1918. By 1920 its value had been proved and as a result, these competitions were organized in thirteen different counties of the province. The chief crop used was oats and a good deal of the seed produced is eligible for registration. The judging in the bin is now being done, under the direction of the Seed Branch representative for Quebec and indications are that a

number of carloads of excellent seed oats will be made available to the trade through these competitions, which have created centres of seed supply. Also last season there were two competitions organized in Nova Scotia, three in Prince Edward Island and one in New Brunswick, but, owing to unsatisfactory weather conditions, the crops were comparatively poor, with the exception of potatoes, which was the crop used in New Brunswick, and from which some excellent stock of certified seed is now available.

These competitions are, therefore, being taken up in a way that shows that their value is appreciated by the farmers who entered them. Another season, we are practically assured, they will be given a trial in the other provinces. A great deal is expected from them and they should become staple institutions in all the provinces and serve a long felt need of encouraging the production of seed supply for commerce.

CANADIAN EGG-LAYING CONTESTS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN, OTTAWA

EGG-Laying Contests in Canada have become a definite factor in one of the newest and greatest developments that up to the present has affected Canadian poultry keeping. These contests are the medium through which certificates of Record of Performance for poultry are obtained, and it is expected that before long registration will be established for those birds qualifying in Record of Performance through the contests.

Laying Contests as spectacular events are by no means new in the poultry world. They have been found valuable in emphasizing the importance of production and in stimulating the breeding and development of better laying stock; but Canada was the first country to

standardize contests as a national medium for obtaining official records of performance. Nor are isolated Egg-Laying Contests, as contests, new in Canada, for the Department of Agriculture of British Columbia and the Department of Agriculture of Alberta each conducted a contest for several years, the former at Exhibition Park, Victoria, and the latter at University Grounds, Edmonton; but it was not until November, 1919, that the contests emerged from individualism and assumed a national character with a definite mission.

One year prior to that date a commencement was made at the Experimental Station, Charlottetown, Prince Edward Island, when a contest of twenty pens was operated for eleven months.

This was in the way of an experiment and was partially in response to a desire from the breeders of Prince Edward Island for something that would concentrate attention upon production and to help demonstrate the importance of the poultry industry on the Island. During the operation of the Prince Edward Island contest, the Dominion Experimental Farms Branch made ready to start contests at several of its farms and stations throughout the Dominion, and, as already noted, on November 1, 1919, the first series of standardized Egg-Laying Contests was inaugurated under practically the same rules and regulations. These contests were located as follows:—

Canadian Egg-Laying Contest, Central Experimental Farm, Ottawa;

Prince Edward Island Egg-Laying Contest, Experimental Station, Charlottetown;

Nova Scotia Federal Egg-Laying Contest, Experimental Farm, Nappan;

Quebec Egg-Laying Contest, Experimental Station, Cap Rouge;

Manitoba Egg-Laying Contest, Experimental Farm, Brandon;

Saskatchewan Egg-Laying Contest, Experimental Farm, Indian Head;

Alberta Egg-Laying Contest, Experimental Station, Lethbridge.

The rules and regulations approved by the Executive of the Canadian National Poultry Association, covering the first year's contests were briefly, that ten birds were allowed to a pen, and that each contestant might substitute up to two birds. The contest lasted for fifty-two weeks, from November 1 to October 29, but in order to secure Record of Performance—which it should be remembered is really the main object of the contest—each bird was allowed to complete her fifty-two weeks of laying; that is, her record did not finish until

52 weeks from the time her first egg was laid, providing she finished her record by December 31, which was the time limit set for all birds. The number of eggs required to qualify for "Record of Performance" is 150 eggs in 52 consecutive weeks. There is also an "Advanced Record of Performance" qualification for which 225 eggs are necessary. These eggs must average 24 ounces to the dozen, and the bird must be pure bred, typical of the breed, and free from standard disqualifications.

The Egg-Laying contests are now in their second year. The number has grown until each province is represented by a contest, and, in addition to these, there is also the Canadian Egg-Laying Contest at Ottawa.

The following is a list of the contests at present in operation, and the number of pens:—

	No Pens.
<i>Canadian Egg-Laying Contest</i> , Central Experimental Farm, Ottawa	50
<i>Ontario Egg-Laying Contest</i> , Central Experimental Farm, Ottawa	24
<i>Prince Edward Island Egg-Laying Contest</i> , Dominion Experimental Station, Charlottetown	25
<i>New Brunswick Egg-Laying Contest</i> , Dominion Experimental Station, Fredericton	21
<i>Nova Scotia Federal Egg-Laying Contest</i> , Dominion Experimental Farm, Nappan	22
<i>Quebec Egg-Laying Contest</i> , Dominion Experimental Station, Cap Rouge . .	24
<i>Manitoba Egg-Laying Contest</i> , Dominion Experimental Farm, Brandon . .	24
<i>Saskatchewan Egg-Laying Contest</i> , Experimental Farm, Indian Head . . .	20
<i>Alberta Egg-Laying Contest</i> , Dominion Experimental Station, Lethbridge . .	22
<i>British Columbia Egg-Laying Contest</i> , Dominion Experimental Farm, Agassiz	27

Slight changes were made in the standardized rules for 1920. Among these, the two most important are that the owner is permitted to keep his pen up to full strength and to mate his birds while in the contest.

At the time of writing full arrangements for the registration of birds are not complete, but it is expected that the registration of all birds that qualify in the Record of Performance through egg-laying contests will be registered. This will prove the biggest forward step in poultry work that any country has

yet attempted, not only will it do away with spurious and misleading advertising of production, but it will establish authentic records of pedigree breeding which will form the basis for future growth and confidence such as nothing else has been able to do.

THE PRUNING OF FRUIT TREES

Modern Methods at Variance with Former Practices

BY M. B. DAVIS, ASSISTANT IN POMOLOGY, CENTRAL EXPERIMENTAL FARM

HORTICULTURAL science is to-day making rapid strides in the solution of problems upon which light has long been wanting. Scientific research is unearthing a wealth of material, much of which offers practical solutions or at least suggestions for some of the difficulties in profitable orchard management.

Pruning practices to-day are radically different from those of the past, and the new recommendations are based on experimental results.

Not many years ago, it was a common practice in the care of the young orchard to head or cut back annually, regardless of the condition of the tree. In fact, this principle in a more or less modified manner was extended to older trees in bearing.

While for the first few years of a tree's life heading back is necessary, especially with varieties tending to produce long growths, with few laterals, the indiscriminate heading back or butchering of trees must be guarded against.

At the Vineland, Ontario, Experimental Station unpruned trees have yielded slightly better than trees pruned. But trees pruned lightly in late summer have yielded almost as well as the unpruned, and have the added advantage of being in better shape for future performance. In fact, the unpruned trees if left indefinitely will reach a condition

where drastic treatment will be necessary to relieve the congestion and to renew the fruiting surface of the tree.

At Ottawa, on young trees, we have found that no pruning has given as good total growth as either spring or summer heading back, accompanied by a larger girth measurement. Where severe heading back was practised, the girth measurement was much less than in the unpruned plots and the trees presented a less vigorous appearance. Where light heading back for the first three years was adopted, the comparison between trees pruned and unpruned showed little difference in favour of the unpruned, but those trees that had been pruned were of decidedly better shape and in better condition for future work than the ones where pruning had been neglected.

These results have simply justified the practice at Ottawa for years past, viz., to prune during the first few years of a tree's life with the express purpose of obtaining a desirable amount of growth placed where it is wanted.

In the case of some trees the growth will require considerable cutting out and some cutting back for the first three or four years. In other cases, it will require very little wood removal, but in all cases the trees should be attended to annually.

Although in the light of modern research we would say, "prune only as much as is necessary to produce a tree of desired type and form," we would caution against swinging from severe pruning to absolutely no pruning for a considerable period, the sequel of which would ultimately be a rather too severe heading back and cutting out to correct past neglect with a possible consequent upset in the balance between nitrogen and carbohydrates. In short, more or

less severe heading back and thinning out during the first four years after planting may be necessary to mould the form of the tree and may be practised without loss of vigor. After that, severe annual pruning should be discontinued and trees that are bearing annually should receive light annual pruning, sufficient only to maintain symmetry, to prevent too long or rangy growth and to prevent the establishment of long limbs with growth only at the tips.

FIBRE FLAX DESEEDING MACHINE

Its Importance in the Development of a Flax Fibre Industry in Western Canada

BY R. J. HUTCHINSON, CHIEF OF FIBRE DIVISION, DOMINION EXPERIMENTAL FARMS

LATE in the year 1918, when the Honourable T. A. Crerar was Minister of Agriculture, the Department instituted through the Central Experimental Farms, an extensive series of investigations and experiments as to the possibilities of utilizing commercially the fibre contained in Linseed Flax so extensively cultivated in the Prairie Provinces.

These experiments were continued well into the year 1920, and resulted in the production of a large range of useful and necessary articles such as insulating felts, twines, cordages, binder twine, yarns for sacking, canvas, burlaps, floor covering, etc, for which there was an immense market.

All of these articles, with the exception of the insulating felt came under the heading of textiles. That is, that the fibre had to be in such a state and condition that it could be drawn and spun, and it was found that to do this, the fibre had to have an average length of about six inches.

It was clearly demonstrated that the fibre in flax straw which had passed through the ordinary toothed cylinder thrasher and blower was of no textile

value, it being so broken that it would not spin.

In preparing the fibre of flax for pure linen purposes, the greatest care has to be taken that the straw is in no way damaged during the operations of harvesting and thrashing, so that the fibre when recovered would retain its full line or length and be valuable as a raw material in spinning. The old methods of harvesting and thrashing the flax, which was cultivated for its linen fibre, was first pulled by hand, and, second, thrashed by hand; both tedious and expensive operations.

It was at once evident that if the fibre of Western Linseed Flax was to become a profitable commercial raw material, then some means other than hand labour must be found for harvesting and thrashing the flax without damaging the straw, and the full length of fibre that it contained. There would be no objection to the Western Flax being cut by binder, instead of being pulled, for a good average crop would be at least 18 inches in length and if the stubble were but three or four inches, the length of straw remaining would be over and above what was absolutely necessary to give the textile length of fibre when recovered.

Test of Deseeding Machine

The past season has witnessed two important developments in harvesting machinery in the Ontario fibre flax fields, namely:—

1. The mechanical flax pulling machine.
2. The fibre flax deseeding and cleaning machine.

The flax pulling machine not having its place as yet in any possible western development of the flax industry, may here be left out of further consideration, but the flax deseeding machine will be apparently called upon to play an important role in the development in any industry that has for its object the utilization of Western Linseed Flax Fibre.

On the 6th day of January, this year, I assisted at a demonstration of the Van Allen Flax Deseeding and Cleaning Machine (invented and constructed by Mr. F. L. Van Allen), which was then deseeding a crop of good ordinary fibre flax on the premises of Mr. Tipling at Ripley, Ontario.

A special trial for capacity was carried out on a steady run of four hours. The average weight of straw passed through the machine was equivalent to two tons per hour.

I made a thorough examination of the materials after delivery by the machine during the test run and found that the seed bolls had been thoroughly separated from the straw; the straw was in no way damaged and was delivered from the machine in a perfect sheaf, well tied and well butted; the chaff and seed were thoroughly freed from the straw; the seed delivered from the machine was exceptionally well cleaned and the chaff blown over contained no flax seed.

Such a machine would handle Western Flax Straw even more readily than the Eastern fibre flax straw, as the Eastern straw is more delicate in texture and consequently more susceptible to bruising and breaking.

From the official report published regarding the experiments carried out with Western straw, it was found that the average weight of straw per acre grown for linseed purposes, when cleaned of its seed and chaff, was about 1,200 pounds. A conservative estimate of the capacity of the new deseeding machine would be at least two Western acres of Linseed Flax per hour or 20 acres on 10 hours run. While this capacity does not equal or can it compete with the large thrashing outfits, there are several points, however, which should be taken into consideration.

1. As the whole flax plant has not to be torn apart in recovering the seed the motive power necessary for driving the machine is only five or six horse-power.

2. Work can be commenced earlier in the day and later in the evening than with the ordinary thrasher, as the dampness does not affect the seed bolls in the same proportion as it does the stalk of the plant, which is hygroscopic. I might say here that upon the day when I witnessed the performance of the new de-seeder, rain fell heavily and although the flax was under cover the seed bolls were quite damp, and despite these most unfavourable weather conditions, the machine was running steadily and doing most excellent work.

3. By this specialized machine, flax deseeding operations in the open field could be commenced without waiting until the general cereal crop had been thrashed and was out of the way, which is generally the conditions under which the Western Flax crop is thrashed.

4. A profit would result from the straw as well as from the seed.

I understand that it is the intention that several of these machines shall be put in operation this year in the West by private enterprise which is now being organized to take advantage of the information gathered and disseminated by this Department.

SPRAYING VERSUS DUSTING

Will Dusting give as Good Results in Pest Control as Liquid Spraying?

BY G. E. SANDERS, IN CHARGE OF INSECTICIDE INVESTIGATIONS, ENTOMOLOGICAL BRANCH

IT is generally conceded that two men and a team can prune, cultivate and fertilize more than 25 acres of orchard, but that they could not with one spray rig do full justice in spraying to more than twenty-five acres. The limiting factor of an economical unit is therefore the spray rig.

A dusting rig can easily take care of sixty acres in one season, and if dusting is equal in pest control to spraying, the change to dusting would have the effect of increasing the economical unit of apple orchards and probably make cultivating the limiting factor in determining the maximum area that one team, two men and equipment could care for, or the economical unit for apple production.

The reputation of dusting has in the past been the reputation of sulphur dust; it might be best to enumerate some of the advantages, questionable points and disadvantages of dusting.

Advantages of Dusting

The advantages of dusting that are generally appreciated are:—

1. *Greater speed in application.*

A dusting outfit is capable of treating from five to ten times as much orchard as a spraying outfit in a given time.

2. *More suitable timing of applications.*

Owing to the rapidity of application the grower can time his applications to better suit the weather and the stage of the fruit.

3. *Less waste time.*

Dusting operations should be done during weather unfit for most agricultural field operations, such as immediately following a rain or very early in the morning, while spraying operations require the best of weather.

4. *Lower cost of machinery.*

The initial cost of a dusting outfit is two-thirds that of a sprayer, the cost of upkeep is less, the gasoline used is less and the duster is a longer lived machine.

5. *Lighter weight of dusting apparatus.*

A dusting outfit with dust and operators on it does not weigh more than one-third the weight of a sprayer ready for operation, so it can be taken over hills and over wet ground where a sprayer would mire.

6. *Less liability to trouble and breakdown.*

A dusting outfit in practice is a reliable machine and is not responsible for delays due to leaky valves, blow-outs, etc., which frequently occur with high pressure sprayers.

7. *Simplicity and speed.*

This makes a greater appeal to the grower. More growers will dust than will spray, even if the total cost is the same, because it is less trouble. This is highly important, particularly in an orcharding community where it is desirable in the interests of every individual to improve the standard of product in the entire community. Of these advantages the first and last are probably the most important.

With the advantages of dusting enumerated, let us find out where there is doubt as to the value of dusting and the things that stand in the way of its universal adoption. The doubtful factors are:—

1. *Doubts as to the efficiency of dust in controlling*

- (a) Fungous disease;
- (b) Biting insects;
- (c) Sucking insects.

2. *Doubts as to the relative cost.*

In examining the data relative to the efficiency of dusting we find a great amount of experimental evidence available on 90-10 sulphur lead arsenate dust.

It is most curious to find that on averaging 30 experiments conducted in New York, Michigan, Illinois, and Nova Scotia, that the total average gives the following:—

SHOWING AVERAGES OF RESULTS REPORTED FROM NEW YORK, MICHIGAN, ILLINOIS AND NOVA SCOTIA.

Region	No. years	No. Expts.	Unsprayed			Sprayed			Dusted		
			Scab %	Worms %	Sound %	Scab %	Worms %	Sound %	Scab %	Worms %	Sound %
New York.....	4	11	43.2	22.0	14.3	11.4	7.8	65.9	12.2	5.0	70.0
Michigan.....	4	7	71.4	12.0	19.7	20.9	0.4	78.4	20.8	0.07	78.8
Illinois.....	4	7	70.4	44.7	11.8	19.1	8.8	60.1	19.9	8.5	58.6
Nova Scotia.....	4	5	51.4	6.6	41.9	12.4	3.7	83.1	12.4	2.9	83.7
Average of.....	16	30	56.5	21.4	22.2	15.6	5.2	71.5	15.6	4.0	74.4

TABLE No. 1—DUSTING EXPERIMENT 1920. PEST CONTROL. S. B. CHUTE'S ORCHARD, BERWICK.

Gravenstein

Plot No.	Material	Scab %	Bud Moth %	Fruit Worm %	Tussock %	G. A. Bug %	Side Worm %	Cod. %	J. Rust. %	Russet %	Count %
1 and 2	Spray calendar, liquid...	29.7	3.4	1.9	0.8	0.25	0.8	0.02	0.5	3.9	4,000
3	Check.....	72.4	2.8	3.8	.4	.15	0.4	0.1	1.	0.3	4,000
4	90-10 sul. dust.....	40.0	5.7	1.8	.1	.1	1.5	.04	.9	2.8	5,000
5	4-14 copper arsenic dust.....	24.2	5.8	1.8	.1	.2	.4	.06	.8	8.	7,800
6	1-2.4 (4-14 cop. ar. dust) 3-(90-10 sul. dust)	19.5	10.1	2.5	.0	.0	.4	.02	1.	4.	4,000
7	1-2.4 (4-14 cop. ar. dust) 3-(90-10 sul. dust)	15.5	8.7	2.3	.16	.2	.7	.3	1.5	3.5	5,000
8	1-2.4 (5-14 cop. ar. dust) 3-(90-10 sul. dust)	15.6	9.4	1.1	.1	.06	1.3	.2	1.2	14.1	3,000
9	1-2.4 (com. Bord. 4-14) 3-(90-10 sul. dust)	20.2	6.	2.9	.1	.4	.3	.03	.5	2.7	3,000
10	1-2.4 (mag. comm. Bord.) 3-(90-10 sul. dust)	15.4	12.8	2.3	.1	16.	.4	.06	.2	2.1	3,000

The foregoing refers to 90-10 sulphur dust only. It is curious to find that the percentage of apple scab in the dusted and sprayed plots is exactly the same, while the dust is slightly superior in insect control and in total number of sound apples produced.

During the past three years we have been experimenting with a copper arsenic dust which was devised by the writer in

1918. This in the proportion of 4 per cent metallic copper and 1½ per cent metallic arsenic has proved in all tests superior as a fungicide to 90-10 sulphur lead arsenate. The count in pest control and the pack out resulting from various strengths of this dust in comparison with sulphur lead arsenate and liquid spray are given in the tables Nos. 1 and 2:—

TABLE No 2—DUSTING EXPERIMENT 1920, S. B. CHUTE'S ORCHARD, BERWICK, N.S.

Pack-out of Gravensteins in large plots.

Plot	Material	No. 1	No. 2	Domestic	No. 3	Culls
		%	%	%	%	%
1 and 2	Spray calendar, 4 sprays.....	48.5	16.6	14.7	18.	1.8
3	Check.....	19.2	9.5	36.2	32.2	2.7
4	1-2-3-4 90-10 sul. dust.....	34.	17.5	29.5	16.2	2.7
5	1-2-3-4 (4-1½ copper ar. dust.)	57.5	12.3	16.5	12.3	1.3
6	1-2-4 (4-1½ cop. ar. dust)					
	3 (90-10 sul. dust.).....	66.6	9.2	9.2	14.	1.3
7	1-2-4 (4½-1½ cop. ar. dust)					
	3 (90-10 sul. dust.).....	61.5	19.	8.1	10.8	0.5
8	1-2-4 (5-1½ cop. ar. dust)					
	3 (90-10 sul. dust.).....	66.4	10.6	14.6	7.9	0.4
9	1-2-4 (comm. Bord) 4-1½					
	3 (90-10 sul. dust.).....	45.2	4.1	23.3	24.6	2.7
10	1-2-4 (Mg. Bord) 4-1½					
	3 (90-10 sul. dust.).....	48.3	6.9	18.1	26.5	count missed

Relative Cost

It will be seen from the foregoing that we now have dusts that can be confidently recommended as equal to liquid spray, both in the control of fungous diseases and biting insects, and it should be mentioned here that the dust was not given what we would call a fair trial as it was applied on the same days as liquid spray was applied and no oftener, whereas the ideal manner of applying dust would be to apply it oftener than liquid spray, varying the intervals with weather conditions.

Last year it was explained that dusting with 90-10 sulphur lead arsenate dust cost more than liquid spraying. This still holds true. It was further stated that dusting with copper arsenic dust costs less than liquid spraying. This also holds for 1921 and will continue to hold.

We can now therefore say that dusting is cheaper than spraying. Dusting is equal to spraying in the control of fungous diseases and biting insects. Dusting is inferior to liquid spraying in the control of sucking insects such as Paylla and green apple bug.

AVAILABLE SUPPLY OF SEED POTATOES IN EASTERN CANADA

The Markets Division of the Seed Branch, Ottawa, has made a detailed survey of available supplies of certified seed potatoes for the coming spring trade. It was found that more than 300 growers, out of a total of 1,400 certified seed potato growers in eastern Canada, have seed available for sale outside of their immediate neighbourhoods. The location and quantity of this seed available to the spring trade is as follows, by provinces: Prince Edward Island, 9290 bags; Nova Scotia, 780 bags; New Brunswick, 31,855 bags; Quebec, 72,650 bags; Ontario, 2,797 bags; Manitoba, 2,362 bags.

The following varieties are available:—Green Mountain, Irish Cobbler, Gold Coin, Early Ohio, Rural New Yorker, Carman, American Wonder, Dooley, Dakota Red and other popular kinds. Purchases may be made in car lots or less quantity and the growers expect a small premium over current prices for

table stock of comparable quality. We believe it to be in the interests of Canadian agriculture that this large stock of certified seed potatoes be used for seeding in Canada this coming season. We are glad to receive inquiries from prospective purchasers, farmers and seedsmen, and are prepared to supply the names of growers who have for sale the varieties mentioned above.

Certified seed is the product of potato fields that have been inspected by trained pathologists under the direction of the Dominion Botanist. To be eligible for certification, the growing crop must pass the Department's inspection standard for freedom from diseases. These standards include also a clause calling for purity of variety. The seed potatoes from the fields that pass inspection are graded, sacked, sealed and marketed on the basis of the Department's certificate.

PROSPECTS FOR MARKETING SWEET CLOVER SEED

The crop of sweet clover seed in Ontario is estimated by the Seed Branch at one hundred per cent increase over 1919. This increase in production is the logical result of the heavy demand for the seed one year ago and the large money returns netted the growers. In 1919, the production of sweet clover seed in Ontario was estimated at 30,000 bushels sold to merchants, plus an unknown quantity that changed hands from the grower to the farmer direct. On this basis, there would be 60,000 bushels of the crop available within the province for the trade this season. This would be additional to the unknown quantity that may be expected to change hands direct.

There promises to be twice as much sweet clover seed in the province this season as last, and prospects of important exports of this seed to other countries are not bright. It may be assumed that there is 60,000 bushels available, which the trade is expected to absorb.

That there will be greater demand in the home market this coming season than ever before seems quite probable, particularly if farmers can buy the seed at a moderate price. A growing popularity of the crop is to be observed in Ontario and extending to other parts of Canada. Thousands of farmers during the past two years have come to believe in sweet clover as a general utility forage crop and one of the best nitrogen gathering crops. It will be

surprising if the natural demand for seed does not materially increase this year over last year; this in face of a plentiful supply of seed of other kinds of clovers at pre-war

prices. But unless there develops a phenomenal demand on the part of Canadian farmers during the next three months, there will likely be a heavy carry-over of unmarketed seed in Ontario.

THE GRADING AND INSPECTION OF EGG SHIPMENTS

LIVE STOCK BRANCH

Regulations under and by virtue of the Live Stock and Live Stock Products Act standardizing Canadian eggs and governing interprovincial and export shipments are administered by the Live Stock Commissioner. These regulations stipulate that eggs shall be candled and graded according to the Canadian standards. The candling of eggs is not a difficult process; it requires but little skill to tell at a glance before the light the difference between good and bad eggs, but it requires technical knowledge and experience to grade eggs for quality and edibility—in other words, to be able to judge the interior quality by candling. The grader must be thoroughly familiar with the structure of the egg, and the distinguishing characteristic of each kind of egg found in commercial work, before he is able to determine accurately the proper grade in which an egg belongs.

Eggs are graded for market according to quality, size, cleanliness, and soundness of shell. When a shipment is prepared for market according to legal

standards and prescribed regulations, a Government inspector is called upon to inspect the shipment, from which he takes a fully representative sample for examination. If the sample taken is found to be satisfactory, the Government mark of approval is placed upon each case, and a certificate is issued approving the shipment. This is inspection by approval and is given at the point of shipment and at the time of shipment. The principles underlying this form of inspection provide a safeguard for both buyer and seller, giving the buyer a guarantee of quality through the medium of the inspector's certificate as issued and the markings placed on the cases, and the seller protection, the whole work of inspection being done at the point of shipment and at the time of shipment. As a result of this standardization and Government inspection, a greater domestic and commercial appreciation of quality in eggs is being developed.

THE ONTARIO TOBACCO CROP

The Ontario tobacco crop of 1920 was the largest in the history of the province, according to the report of Mr. F. Charlan, Chief of the Tobacco Division of the Dominion Experimental Farms. The total production was 21,681.100 pounds, including all varieties, as against 17,000,000 pounds in 1919. White Bur-

ley aggregated 19,432,000 pounds and constituted the bulk of the crop. The area devoted to the crop was 20,114 acres, Essex and Kent contributing 92 per cent of the total. At the present time there is somewhat less than one million pounds of the 1919 crop still in the hands of the growers.

RESULTS OF THE SECOND PRINCE EDWARD ISLAND EGG LAYING CONTEST

THE following are the final awards in the Second Prince Edward Island Egg Laying Contest which closed on October 29, 1920. The contest was held at the Experimental Station, Charlottetown:—

No. or value.		Awards
\$30.93½	1. To the pen showing the largest revenue over cost of feed, from the sale of eggs, in the year— Mrs. R. W. Bullpitt, Cardigan, P.E.I. 1 pen of White Leghorns, 5 pullets and 1 cockerel.	\$30.00
\$24.53	2. To the pen showing the second largest revenue over cost of feed, from the sale of eggs, in the year— Mr. P. L. Campbell, New Glasgow Mills, P.E.I. 1 pen White Leghorns, 5 pullets and 1 cockerel.	\$25.00
1525	3. To the pen laying the largest number of eggs in the year— Mrs. R. W. Bullpitt, Cardigan, P.E.I. Cash prize.	\$20.00
1426	4. To the pen laying the second largest number of eggs in the year— Mr. F. C. LeLachuer, Murray Harbour, P.E.I. Cash prize.	\$15.00
1424	5. To the pen laying the third largest number of eggs in the year— Mr. J. B. Millman, Kensington, P.E.I. Cash prize.	\$10.00
1404	6. To the pen laying the fourth largest number of eggs in the year— Mr. H. L. Machon, Murray Harbour, P.E.I. Cash prize.	\$5.00
Hen No. B. 188. 196	7. To the bird laying the largest number of eggs in the year— One silver cup, donated by the Caldwell Feed and Cereal Company, to be won twice out of three contests, and to remain at the Experimental Farm until finally won. Mrs. R. W. Bullpitt, Cardigan, P.E.I. Value.	\$50 00
Hen No. B. 175. 195	8. To the bird laying the second largest number of eggs in the year— Mr. F. C. LeLachuer, Murray Harbour, P.E.I. Cash prize.	\$10.00
Hen No. B. 129.	9. To the bird laying the third largest number of eggs in the year— Mr. Benj. Rodd, Brackley Point Rd., P.E.I. Cash prize.	\$5.00
	10. To the pen laying the largest number of eggs each 4 weeks— Cash prize (four weekly).	\$2.00
	1st period (pen) Mr. B. Rodd, Brackley Pt. Road, P.E.I.	
	2nd " Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
	3rd " Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
	4th " Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
	5th " Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
	6th " Mr. R. G. Fuller, Amherst, N.S.	
	7th " Mr. H. L. Machon, Murray Harbour, P.E.I.	
	8th " Mr. H. L. Machon, Murray Harbour, P.E.I.	
	9th " Mr. H. L. Machon, Murray Harbour, P.E.I.	
	10th " Mr. J. B. Millman, Kensington, P.E.I.	
	11th " Mr. J. B. Millman, Kensington, P.E.I.	
	12th " Mr. James Cain, Cardigan, P.E.I.	
	13th " Mr. H. L. Machon, Murray Harbour, P.E.I.	

THE AGRICULTURAL GAZETTE OF CANADA

No. or value.	Awards.
11. To the hen laying the largest number of eggs each 4 weeks—	
Cash prize (four weekly)	\$1.00
1st period (pen) Mr. H. L. Warren, St. Lambert, Que.	
2nd " Mr. R. C. Hamilton, Inverness, N.S.	
3rd " Mr. J. R. McMullen, Truro, N.S.	
4th " Mr. H. L. Warren, St. Lambert, Que.	
5th " Mr. H. C. Fraser, Montague, P.E.I.	
6th " Mr. H. L. Machon, Murray Harbour, P.E.I.	
7th " Mr. Bert Horsfall, St. Lambert, Que.	
8th " Mr. H. L. Machon, Murray Harbour, P.E.I.	
9th " Mr. E. Howatt, French River, P.E.I.	
10th " Mrs. R. G. McLaren, New Perth, P.E.I.	
11th " Mr. Benj. Rodd, Brackley Point Rd., P.E.I.	
12th " Mr. James Cain, Cardigan, P.E.I.	
13th " Mr. Mont. Annear, Montague, P.E.I.	
3008.73 ozs. 12. To the pen laying the largest weight of eggs in the year—	
Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
1 White Leghorn pedigree cockerel.	\$10.00
108 13. To the pen laying the largest number of eggs before New Years—	
Mr. Benj. Rodd, Brackley Point Road, P.E.I.	
1 Barred Rock pedigree cockerel.	\$10.00
515 14. To the pen laying the largest number of eggs during the first five months—	
Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
1 White Leghorn pedigree cockerel.	\$10.00
(2) 15. To the pen having the largest number of birds qualify for (11 to Dec. 31). Record of Performance (150 two-oz. eggs).	
Mr. H. L. Machon, Murray Harbour, P.E.I.	
1 Barred Rock pedigree cockerel.	\$10.00



PART II

Provincial Government Departments

THE SPECIAL SCHOOLS OF AGRICULTURE

A New Type of School Being Developed to Equip Students for Practical and Successful Farm Life

THE SCHOOL OF AGRICULTURE AT KEMPTVILLE, ONTARIO

THE Kemptville Agricultural School is situated within half a mile of the village of that name in Eastern Ontario. The decision to establish the school was arrived at in 1916. It is the outcome of an effort on the part of the provincial agricultural authorities to provide instruction in the essentials of successful farming and home making or household science for the young men and women from the farm who reside in that portion of the province. While not an agricultural college in the acceptance of the term, it is second only to the Guelph and Macdonald colleges in that section of Canada as an institution for specialized education in agriculture. At the Guelph and Macdonald colleges both the theoretical and practical sides of agriculture are taught, whereas, at Kemptville, the instruction given is intended to equip for farming as a vocation. The formal opening of the school took place on the 18th of February at the expiration of the present season's short courses, and this date may be said to be the real beginning of a school that will no doubt have a far-reaching influence on the agriculture of the district in which it is located.

Splendid Buildings

The buildings of the school are commodious and attractive. The new main building is a three-story brick structure of good design and modern to the last detail. It is 120 by 61 feet, ventilated, fireproof, with offices, reading rooms, laboratories, class rooms, cooking rooms, etc. In addition, there are the judging pavilion and gymnasium, the agricultural engineering building, the poultry plant, with all the barns and out-buildings necessary for a complete farm. Any one who is fifteen years of age and has had a public school training may enter the school, and there are no tuition fees. Students residing in school are charged \$5 a week for room and board.

Practical Courses

The school offers two courses. One is the regular two-year course which aims to give practical farming instruction in all branches of the subject. It lasts from October to April each year. It includes, in addition to all the knowledge needed directly on the farm, woodworking, principles of breeding,

stock judging, keeping of records, soil management, gas engines and farm tractors, forge work and horse shoeing, concrete work, harness repair, drainage, landscape gardening, forestry, English, public speaking, and special courses for teachers.

The short course consists of a few weeks of intensive study on the main branches of farm work. It is divided into three branches: general agriculture, farm power, and household science, the latter being the course for girls and

that more farmers fail from lack of knowledge of production costs than from any other cause.

The Farm and its Objects

The purposes of the farm connected with the school, as emphasized by the Principal, are, first, to furnish feed for live stock; second, to supply first generation, registered seed for the district. "There was not another farm in Eastern Canada last year that supplied as much



THE MAIN BUILDING, KEMPTVILLE AGRICULTURAL SCHOOL

women. To-day there are 26 taking the regular course and 73 the short course. It has been found that many pupils who take the short course get a taste for knowledge and come back next year, entering themselves for the two years of study.

The courses are intensely practical. Unlike some schools, Kemptville does not insist on more than a working knowledge of chemistry, soil bacteriology, and milk bacteriology. Book-keeping for the farm is insisted on. The boys are taught that good business methods pay, and

of this seed as we did, and every bit we had was sold," says Mr. Bell. "Moreover, we sold this seed to the farmers at reasonable prices; that is, instead of feeding it to the stock we sell it for enough to purchase other feed for our stock. Our third object is to demonstrate the utility of short rotations of crops. One thing badly needed in Ontario is to stop the destructive practice of sowing, say, oats, year after year, on the same land."

Fruit growing is also being taken up. Last year a 12-acre orchard was started. Another thing which the casual passer-

by will notice in future years is that along the highway between Kemptville and Bedell fine shade trees have been planted by the school. These are small as yet, but in a comparatively few years they will make a magnificent avenue along the Ottawa-Prescott highway, on which the institution faces.

While pupils do not work the farm, they are obliged to take part in the care and management of the live stock. On the farm are Holstein and Ayrshire

Community Service

One thing that Principal Bell insists upon is that the staff of the school shall be of use to the community during the time the harvest is on and the school is not in session. They are then required to give special assistance to the agricultural representatives of adjacent counties, and to keep in close touch with the farming industry of Eastern Ontario. "It is necessary for the staff to keep in close touch with the farmers,"



THE FIRST STUDENTS TO TAKE THE REGULAR COURSE AT KEMPTVILLE

cattle, Yorkshire hogs, Shropshire sheep, and Clydesdale horses. All the barns are new and equipped in modern style. Pupils are trained to figure out new undertakings. For example, last fall pupils were told to get out a 100 poultry run. They were furnished the blue prints, and from them they worked out the quantities, ordered the material, and did the work. From this, in a few months, will spring a poultry industry of no mean magnitude.

he stated, "in order that our work shall not become too academic."

In Professor W. J. Bell, B.S.A., the school has a principal whose personality is likely to prove a valuable asset to the institution. Realizing that many farm boys are deficient in mathematics and English, he has instituted an extremely practical course in those subjects. The farmer of to-day should be able to express himself, and he therefore insists that the students practise speaking in

public in order that they may develop qualifications for the best type of rural citizenship.

With Professor Bell are associated F. K. Hampson, B.S.A., who deals with field husbandry, chemistry, bacteriology and soil physics; James Childs, farrier; Peter McClelland, herdsman and dairy instructor; Dr. W. E. Baker, veterinary science; A. J. Logsdail, lecturer in horticulture, entomology, and botany; F. W. Brown, farm foreman; and Miss E. E. Weaver, secretary of the

school. L. G. Hermpel, B.S.A., instructor in agriculture, drainage and engineering, has just left the school, and his place has not yet been filled.

At present the school is somewhat hampered by lack of dormitory accommodation. It is one of the objects of the promoters that the school should be residential in character, and it was announced by the Deputy Minister of Agriculture, Mr. W. Bert Roadhouse, who represented the Ontario Minister at the opening, that plans had already been prepared for a residence and that it was hoped to complete the same by fall.

THE ALBERTA SCHOOLS OF AGRICULTURE

Three New Schools in Operation

BY HON. DUNCAN MARSHALL, MINISTER OF AGRICULTURE

DURING the summer of 1920 the construction of three new Schools of Agriculture in Alberta was completed. The schools are located at Raymond, Gleichen, and Youngstown, which together with the original schools built at Claresholm, Olds, and Vermilion, make in all six schools of Agriculture in the province. This gives Alberta the most comprehensive facilities for instruction in vocational agriculture of any province in Canada. In spite of a short crop, particularly in the vicinity of the Youngstown school, the attendance this year has been very largely increased.

Situated as it is in the centre of a large mixed farming district, the Olds school has always had the largest attendance, and the schools at Gleichen and Youngstown were built with a view to drawing from the attendance at Olds as well as serving a new territory. In spite of this fact, the enrolment at Olds this year was larger than in any previous year. The highest enrolment, until the present year, was 160, while the enrolment this year numbered 162. As

is always the case at institutions of this kind, for one reason or another, a number of students drop out. This year the low selling price of grain had a good deal to do with it. The attendance since Christmas has been slightly reduced, but there are in attendance at this school now 148 students, while at the new schools at Gleichen and Youngstown there are respectively 40 and 38 pupils, which is a good first year class and will easily be doubled next year. The school at Raymond has made a record for the first year, opening with 98 students. This large class is a striking testimony to the value of distributing the Schools of Agriculture in different parts of the province. In past years, ten or a dozen students from this district attended the Claresholm school, but the building of the school at Raymond, where the students would be within a convenient distance, has increased this number to the splendid attendance of almost 100. This has not materially reduced the number attending Claresholm, where the maximum in former years was about 100, and this year is an even 90. The

total attendance of pupils in agriculture at the schools and in the faculty of agriculture at the university numbers 510, which is something of a record in agricultural education in a province that contains the smallest population of any of the Canadian provinces outside of the three Maritime Provinces, and where a system of agricultural education has been so recently established. With anything like reasonably good years in agricultural production, there should be no difficulty in doubling this number in two years, and in recruiting from these

other useful and necessary work on prairie farms, is given special attention by skilled instructors. Dairying and poultry keeping are also given a very prominent place in the course of study, so that when students have taken the two-year course at these schools they have secured a comprehensive education in practical agriculture, as applied to the business of farming in Western Canada.

Agricultural education, however, is useful only to the boys who become pupils in an educational institution for the teaching of agriculture, and the

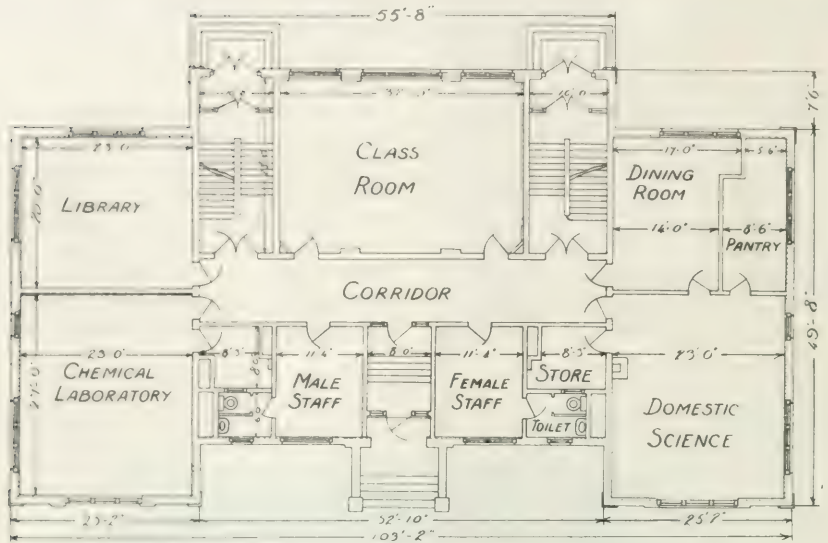


NEW AGRICULTURAL SCHOOL AT RAYMOND, ALBERTA

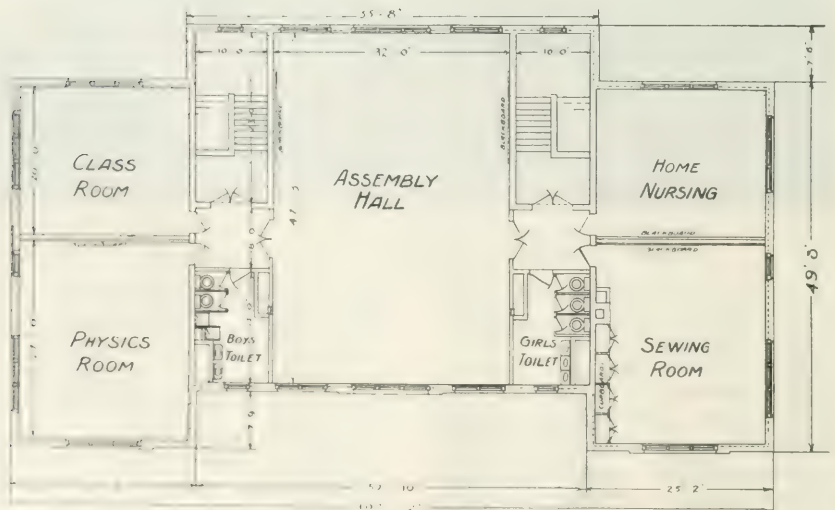
schools a class of students taking the degree work in the university numbering up in the hundreds.

The Department of Agriculture has taken particular care to equip these schools and man them with teachers in such a way that the very best class of agricultural instruction may be given. We are aiming to make the two-year course in the schools the equal of any like course of instruction given in Canada. Particular attention is given to Field Husbandry, Animal Husbandry, and Farm Mechanics. In the latter, a very practical course in farm blacksmithing, including the shoeing of horses and

greatest advantage that we find in the Alberta system is in the number of our institutions and the manner in which they are distributed through the province. The very nearness of a school of agriculture to farmers' sons and daughters is often the greatest inducement for them to attend. If the school were not conveniently situated to them, they might not interest themselves in agricultural education, and in a new country like ours they might not learn enough about the kind of instruction given in these establishments until it was too late for them to start to school again. Besides, many farmers' sons and



GROUND FLOOR PLAN



SECOND FLOOR PLAN

PLAN OF NEW AGRICULTURAL SCHOOLS IN ALBERTA

daughters have a good deal less hesitation in starting in at a school of this kind than they would have in making preparations to attend a larger central institution; but after two years' experience in the school they have a desire for further instruction and often become students at the Faculty of Agriculture in the university so as to complete their training.

In connection with the schools, short courses are given each winter. These are attended by a large number of short-term students or farmers themselves, who find it difficult to become regular students at the schools. The location of the schools in different parts of the province also facilitates work of this kind, and arouses in the community a new interest in agricultural education and what it means to our future methods in farming. In every locality where a school is established there is a spirit of pride among the people in their school,

in what it stands for, and in the advantage it affords to the boys and girls in the neighbourhood, which tends to build up, not only a new interest, but a local pride in scientific agriculture, and spreads the gospel of better farming and the breeding of better live stock on the farms.

The official opening of the three new schools took place recently, and large public meetings were held, which were addressed by the Premier, the Minister of Agriculture, and the President of the Alberta University, as well as a number of other speakers interested in education and its different phases in the province. All of these meetings were not only largely attended, but a very active and real interest was shown by the people who came in their motor cars for miles, not only to attend the meeting but to inspect the schools in operation, and the result of this visit is bound to be a largely increased attendance next year.

AN AGRICULTURAL AND TECHNICAL SCHOOL FOR PRINCE EDWARD ISLAND

THE opening on December 3, at Charlottetown of the Provincial Agricultural and Technical School marked the inauguration of a new departure in the educational system of Prince Edward Island. The school was officially opened by His Honour, Lieutenant-Governor McKinnon, who, in a short address, declared that a more necessary institution could not have been started in the province. Principal Vernon Crockett occupied the chair, and short addresses were given by Premier Bell, Prof. L. W. Gill, Director of Technical Education for the Dominion, Hon. W. M. Lea, Commissioner of Agriculture, and Mr. R. H. Rogers, Chief Superintendent of Education. A few musical selections and some agricultural motion pictures completed the programme.

The school occupies the building formerly known as the Rena McLean Memorial Hospital. Immediately attached is an area of twenty-five acres of land, while the Dominion Experimental Station is within a few minutes walk of the institution.

This new school recently organized by the province in conjunction with the Educational Branch of the Department of Labour for Canada and the Agricultural Instruction Branch of the Department of Agriculture, is primarily for the education of farmers' sons over fourteen who have an inclination to remain on the farm, but is suitable for farmers of any age. There are no tuition fees nor will a scholastic test be required for entrance. Special attention will be given to boys whose educational attainments are deficient. The course

covers two winter periods of twenty weeks each and has been formulated to reach the following objectives:—

1. To give the largest amount of information and training in practical farming in the shortest possible time.
2. To train the farmer how to solve his own problems and increase his net returns.
3. To unfold to him the many opportunities on the farm and the possibilities of rural life.
4. To stimulate him for the filling of a more useful place in the social and economic life of the community.

The subjects to be taken up are as shown below:—

Farm animals;
Crops and fertilizers;
Farm machinery and engineering;
Commercial English;
Dairying;
Farm management;
Civics;
Horticulture;
Poultry;
Commercial arithmetic;
Farm economics;
Woodworking;
Blacksmithing.

Already the school has a day enrolment of thirty, and a total in the evening classes of sixty-two. The hours are from 8.30 a.m. till 4 p.m., and each evening from 7.30 till 9.30. The staff consists of the following qualified instructors:—

Vernon Crockett—Principal and instructor in English, Arithmetic and Rural Economics.
Wm. Reid, B.S.A.—Animal Husbandry.
A. F. Hansuld, B.S.A.—Field Husbandry.

J. R. Waugh—Woodworking and Farm Engineering, mechanical drawing.

Henry Whitlock—Motor Mechanics.

G. S. Rogers—Wireless Telegraphy.

S. Campbell—Blacksmithing.

In addition to the regular course special lectures are given in farm management by Mr. W. M. Lea, Commissioner of Agriculture; in poultry by Mr. Cyrus Poirier, Poultry Division, Live Stock Branch; in Dairying by Mr. F. T. Morrow, Dairy Inspector; and a series of demonstrations are being given throughout the winter by Mr. J. A. Clark, Superintendent of the Experimental Farm, and his staff.

Although the only existing course not directly connected with farming is Wireless Telegraphy, it is hoped that the school will develop into a general agricultural and technical institution, and ample provision has been made for expansion. The number of courses is limited only by the demand for training and the available funds for expansion.

The institution will be financed jointly by the Dominion and Provincial governments. The province will provide one-third of the cost, while the remaining two-thirds will be met from the grants made to the province under The Technical Education and The Agricultural Instruction Acts.

THE CARLETON COUNTY VOCATIONAL SCHOOL, WOODSTOCK, NEW BRUNSWICK

THE Carleton County Vocational School at Woodstock, New Brunswick, has been established in the building donated by the late L. P. Fisher, K.C., for the purposes of vocational education. The building, which was erected in 1913, was originally equipped for giving instruction in agriculture from the Agricultural Instruction Grant. Afterwards, the war intervened and the department of agriculture for the province found it impracticable for the time being

to proceed with organization. The matter remained in abeyance until 1919, when an arrangement was made whereby the institution was taken over by the Carleton County Vocational School Board, and a course of instruction organized in Agriculture, Home Making, Typewriting and Stenography. The school offers a free course of tuition in these subjects to residents of Carleton county who are not less than fourteen years of age. There are no scholastic

requirements as to entrance in the Agricultural and Home Making courses; applicants for enrolment in the Course in Typewriting and Stenography are required to hold High School Entrance certificates. In Agriculture and Farm Mechanics a two year course is provided. The Home Making and Commercial Courses are of one years' duration.

In its relation to the vocation of farming the objective is to provide farm boys and girls with the necessary preparation and training for successful life in the country. The school also aims to become a social centre for the community, with special reference to rural residents. Courses, other than those outlined herein are to be established wherever the demand warrants their establishment. The subjects of instruction in Agriculture are Field Husbandry, Animal Husbandry, Horticulture, Dairying, Poultry, Botany, Veterinary Science, Entomology, Apiculture, Geology, Bacteriology, Citizenship and Economics, Physics, Practical Agricultural Chemistry, English Arithmetic, Benchwork, Forging, Gas Engine and Automobile Repair work, Carpentry, Concrete work and Mechanical Drawing. The Home Making Course includes Cooking, Laundering, Household Chemistry, Dietetics, Sewing, Home Nursing and Home Management, with academic subjects added.

Project Work

Every student in agriculture is required to do project work at the home farm during the summer months, under the supervision of the agricultural teachers. Project Work consists of some work closely related to the subject matter taken up during the school year, and is carried out by the student during the summer according to plans formulated in class-room, putting into practice the principles studied and discussed during the course, whether the project be one in field crops, poultry, dairying or livestock. Before receiving the school's

diploma, the second year student must have successfully completed his senior project. This system does away, to a certain extent, with the necessity or advisability of having a farm in conjunction with the school, and, furthermore, it carries the work of the school and its students out into the country. The supervision work carried on by the agricultural teachers affords the instructors a suitable medium through which to spread the agricultural gospel to the parents and neighbouring farmers—an opportunity which is taken advantage of whenever possible.

Although the school at present only caters to the youth of Carleton county, there are, this year, twenty-six students enrolled for the two year course in Agriculture, there being eighteen freshmen and eight second year students. This attendance, in view of the fact that the school is only in its second year of activity, compares favourably with the enrolment at agricultural schools and colleges throughout Canada, a statement concerning which appeared in the December, 1920, issue of the Gazette. Carleton county has an approximate population of 22,000. The director of the school, Mr. R. W. Maxwell and his assistant, Mr. R. C. Elder, are both graduates of the Ontario Agricultural College, having completed their course with year 1918.

Mr. S. C. Heckbert, a graduate of Mount Allison Academy, Sackville, N.B., is in charge of the departments of Manual Training and Farm Mechanics. Other members of the staff are: J. L. Sullivan, D.V.S., Veterinary Science; Miss Rheta M. Inch, Home Making; Miss Evelyn Greaney, Stenography, and Miss Grace Caughlin, Academic Subjects.

In addition to the sixty-five students enrolled in the regular courses, two hundred of the pupils from the local Public and High schools receive part-time weekly instruction in Domestic

Science and Manual Training. Evening classes, with an enrolment of seventy-five students, are held twice weekly during the winter month. Seasonal and appropriate short courses are

arranged from time to time; one in Gas Engines and Tractor Work is scheduled for the period February 22-26, at which the tractor companies active in this territory will have representation.

OPENING OF "MILLS HALL" AT THE ONTARIO AGRICULTURAL COLLEGE

BY F. THAMAS

THE new men's residence at the Ontario Agricultural College was formally opened on January 11, on the occasion of the convention of the Ontario Experimental Union. The building was named after Dr. James Mills, who occupied the position of president of the college from 1879 to 1904.

President J. B. Reynolds, in a brief address, paid high tribute to Dr. Mills as the man who through the early and somewhat difficult years of the history of the college had so successfully managed the affairs of the institution.

Dr. Mills, in replying, referred to some of his earlier experiences. The college at one time was scorned by the average farmer, and it was only by establishing excursions to Guelph that it had gained popularity with the farming public. This apathy on the part of the farming community, the dragging of college affairs into politics, and the difficulty in procuring adequate funds greatly hampered progress in the early days. Dr. Mills advocated the paying of sufficiently large salaries to retain good men on the staff. Deputy Minister

Roadhouse, in the absence of the Minister of Agriculture, dedicated the new dormitory.

Mills hall is situated on the men's campus directly opposite Macdonald hall. It will accommodate 136 students. The building is L-shaped, three stories high, of Gothic architecture, with a black slate roof. The short wing is 114 feet and the long wing 152 feet. There are two entrances, one facing the men's campus, and the other, the main entrance, over which is inscribed "Mills Hall," faces the dining hall. The masonry of the walls is of Georgetown sandstone and the trim of Ohio sandstone. The layout of the floors is identical with the exception that on the ground floor in the south wing is a large parlour. On each floor is a large wash room finished in marble and white tile, which provides wash basins, showers, baths, and toilets. All the corridor floors are laid in red quarry tile. The walls are stucco and the ceilings white plaster, thus making the rooms bright and sanitary. The rooms are furnished with fumed oak chiffoniers, desks, and chairs.

SEED-CLEANING PLANTS IN ONTARIO

Great increase in the Yield of Cereal Crops would Follow General Introduction. Co-operation the Solution.

FROM AN ADDRESS BY E. C. HART, B.S.A., DIRECTOR, CO-OPERATION AND MARKETS.

THE importance of good seed cannot be over-estimated. I am of the opinion that if every community throughout the province had a power seed-cleaning machine at its disposal,

such machine would pay for itself many times over each year in the increased yield per acre alone. There are in the province about 650 flour and grist mills. There are also 500 power seed and grain

cleaning machines. With regard to these 500 machines, it is estimated that between 75 and 80 are used exclusively in the flax mills, 100 are used in the seed houses for cleaning grasses and clover seeds, and almost all of the remainder are used as grain cleaners in the elevators and flour mills, but not for cleaning the cereal seeds. These figures would indicate that for the planting of five and a quarter million acres of grain every year, a very small proportion of the seed used ever goes through a power machine. The most that can be said, perhaps, is that the great bulk of the seed has had but a passing acquaintance with the fanning mill, the result being, of course, that the yield per acre of our cereals crops is very materially lessened.

In the Canadian West, and in some states across the line, the local elevators are for the most part owned by the farmers themselves. In the province of Ontario, however, with few exceptions, local elevators are not farmer owned, the result being that the local marketing of grain is not on a basis satisfactory to either the grower or buyer. The grain is sold by the grower at a flat price and not on a graded basis, and the careful grower shares his returns with the careless producer so that each is receiving the average price. If such local elevators were co-operatively owned, a grading machine installed and the producer paid for his deliveries on the basis of *graded* grain delivered, taking his screenings home with him, this would result in a local system of marketing much more equitable than the present system. The size of the farmer's cheque, made on the basis of his delivery from the business end of the grading machine, would materially affect his appreciation of the importance of the quality of the seed he sows. To encourage the use of better seed, I suggest that if we had a more satisfactory system of marketing the grain crops, such better system of marketing would demonstrate, from a financial standpoint, the benefits of good seed, and in this direction possibly lies

the solution of a more general use of high-class seed than obtains at the present time.

Aside from the advantages from the seed standpoint of such a system of local marketing, there are many other desirable features involved. Such a system, for example, affords a much easier market. That is to say, the buyer is looking for such grain and the seller does not have the same difficulty in seeking a market for his produce. There are many other such business advantages to be obtained where the local elevators are farmer owned. I mention this matter of the marketing of grain not only because of its influence in bringing home in a practical financial way the benefits of good seed, but also to afford a business organization through which the seed business, as such, can be put on a commercial basis. That is to say, the volume of seed produced in a section is, in many instances, not great enough to carry a respectably sized seed business. Where it can be handled, however, in connection with grain marketing this difficulty is overcome. The seed and grain businesses are interdependent and, where carried on together, the main part of the business, which is grain marketing, will largely carry the overhead.

With seed the farmer is both producer and consumer, and there is no reason why he should not also be his own middleman. Even where it is impossible to establish or take over the local grain marketing, it appears to me that there is room for every community in the province, with the expenditure of very little money, to have a proper seed-cleaning machine. A small building could be rented, and perhaps \$1,000 to \$1,500 expended in the purchase of a small gasoline engine and seed-cleaning machine. Even where there is not an operator who could handle such machine to the best advantage the results would be much more satisfactory than where all the seed in the community simply goes through the individual fanning mill.

A short while ago I stopped off at the village of Cottam, in Essex county, and saw a practical demonstration of what I have been trying to outline. The manager of the local organization of farmers at that point is here to-day and will, I think, bear out the statements I have made above.

Loans to Seed-cleaning Plants

At the 1920 session of the Ontario Legislature an Act was passed to provide for loans to co-operative associations for the purpose of assisting in the establishment of seed-cleaning plants. Provision is made for loans to co-operative organizations incorporated under The Ontario Companies Act. Loans are made up to 50 per cent of the value of the property on which the loan is made and each loan cannot exceed \$3,000. The loan is without interest for two years, after which the interest is 6 per

cent. Half the loan is repayable in five years and the other half at the end of a further period of five years, with the privilege of repaying the loan at any time. While this Act may not be of very great financial assistance, if it arouses interest in the seed question it will have been worth while. In spite of the fact that very few seed centres are operating in Ontario at the present time, their organization has certainly been worth while in arousing interest in connection with the production of good seed. If the seed centres were operated in connection with some other business concern in the locality, it would be of great assistance in establishing these seed-cleaning plants in the rural parts of the province. It appears that if this question of grain marketing on a co-operative basis were established, a natural and inevitable result would be the general use of better seed.

COMBINED STANDING FIELD CROP AND SEED COMPETITIONS IN ONTARIO

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES.

IN addition to the regular Standing Field Crop Competitions, a new form of competition is available this year in Ontario known as "The Combined Standing Field and Threshed Grain Competition." Prizes will be awarded on the basis of the combined score on crop in the field and the threshed grain. The standing crop will be judged first, but in this competition the threshed grain will also be judged in the bins or sacks of the competitors, the combined scores determining the final award. The Agricultural Society will decide the kind of crop in which to enter.

The regulations governing the new form of competition are in part as follows:—

1. Societies that decide to conduct this special competition will not be eligible to enter the usual Standing Field

Crop Competition with the same kind of grain; they may, however, enter the Standing Field Crop Competition with another kind of crop.

2. Societies deciding to enter this combined competition should have 15 entries.

3. The cleaned seed will be judged either in the sack or bin on the premises of the competitor on or before January 15.

4. The seed used by the competitors must be Registered Seed, or, if this is not available, seed approved by the Provincial Seed Committee.

The following are the varieties from which selection may be made:—

(a) *Oats*.—Banner, O.A.C. No. 72, Victory, Gold Rain and O.A.C. No. 3.

(b) *Barley*.—O.A.C. No. 21 and Mand-scheuri.

(c) *Spring Wheat*.—Marquis, Red Fife, Huron.

(d) *Peas*.—Arthur, Golden Vine, Canadian Beauty.

(e) *Corn*.—North Dakota, Longfellow, Quebec Yellow & Quebec 28,

(f) *Potatoes*.—Green Mountain, Dooley, Carman No. 1, Irish Cobbler, Early Ohio and Gold Coin.

5. All competitors are required to sow the same kind of grain and the same variety. That is to say, if a society decides to enter in oats, it will decide what variety of oats it will select for this competition and each competitor must sow the same variety.

Large prizes are offered for this competition to encourage the production of high-class seed of approved varieties and in substantial quantities.

STANDING CROP AND SEED GRAIN COMPETITIONS IN QUEBEC

BY L. P. ROY, CHIEF OF FIELD CROPS DIVISION

IN order to encourage the farmers of this province to produce pure and strong seed, well suited to the special conditions of each district, the Quebec Department of Agriculture, in conjunction with the Dominion Department of Agriculture, will grant again this year a special subvention to agricultural associations organizing a special competition called "Seed Competition."

This movement, launched in this province in 1919, made splendid headway last year, when twelve agricultural associations participated. In order to further develop, on a commercial basis, the production of pure seed in such districts as are the most likely to produce seed in quantity, and with a view to helping the farmers to harvest high grade stock seed, it was decided to amend the regulations governing the purchase of stock seed. The main clauses of the regulations governing these competitions this year are the following:—

(1) Any association organizing for the first time a seed competition of this kind must, if the crop selected is wheat, oats, barley, peas or buckwheat, purchase for

the competitors sufficient quantities of pure seed to sow the area specified in the regulations.

(2) Samples of at least one pound of the stock seed that it is proposed to use must in every case, be submitted to the department.

(3) The minimum number of competitors for such competitions is twenty-five; when the number is forty, an additional grant of fifty dollars is placed at the disposal of the Association.

(4) The crop entered will be inspected in the field when ripe; a second inspection will be made in winter in the granaries of the various competitors, after the seed has been threshed and selected.

Special steps will be taken this year to encourage, through such competitions, the production of registered seed on a large scale and to establish, in the most suitable districts, production centres in which it will be necessary to set up small local warehouses, fitted with the necessary machinery for the selection and commercial grading of seed.

ORGANIZATION AMONG SEED GROWERS IN ALBERTA

The Beginning of an Important Movement for Supplying Pure Seed

BY PROFESSOR G. H. CUTLER, COLLEGE OF AGRICULTURE, UNIVERSITY OF ALBERTA

Nearly all the provinces of the Dominion and states in the Union have given some attention to the organization of seed-growers. It is not the intention herein to go into a discussion of the different organizations that have been effected, but to refer to what Alberta is prepared to do for those farmers who are interested in, and feel qualified to undertake seed-growing on a scale that makes it worth while not only to the individual but as well to the community at large.

During the past three years the department of Field Husbandry of the University of Alberta has been putting forth every effort to standardize and purify old varieties and breed up new ones of the different farm crops. During that time there has been an insistent and steady demand for pure seed representing suitable varieties, and for information as to how registered seed can be obtained or produced. In answer to these applications for seed, samples in nearly every case have been sent out. The size of the samples has varied from a few ounces for testing to three bushels or more for multiplication. During the past two seasons over fifteen hundred samples of seeds were placed in the hands of interested seed growers who are undertaking to test and multiply given improved and purified strains of the different farm crops. We feel that this is the beginning of a very important movement in seed production in Alberta, but if it is to attain its highest development, organization of a definite character seems imperative. For instance, after spending

years of effort upon the improvement of a given strain of wheat, it is not enough that it be distributed promiscuously. On the contrary, a scheme must be developed whereby strains and varieties can be distributed and multiplied expeditiously, so that they ultimately may reach the greatest number of growers, true to name and variety, and in the highest possible state of purity. In meeting adequately, therefore, the needs of the farmers of Alberta, the University at Edmonton is prepared to co-ordinate all co-operative seed-testing, seed distribution, and multiplication work under one organization to be known as the "Alberta Crop Improvement Association," with headquarters at the university, under the administration of the head of the department of Field Husbandry.

A PROVINCIAL SEED BOARD
FOR ALBERTA

A Provincial Seed Board has been established in Alberta consisting of Mr. J. D. Smith, Superintendent of the Seed and Weed Branch, Professor G. H. Cutler of the University of Alberta, and Mr. G. M. Stewart of the Seed Branch of the Dominion Department of Agriculture at Calgary. The Board is already preparing regulations for the control of various competitions organized under the Dominion Seed Branch requirements: These consist of field crop competitions; combined seed crop and cleaned seed competitions; local seed fairs and provincial seed fairs.

POTATO DEMONSTRATIONS IN ONTARIO

Results from the Agricultural Representatives' Demonstration Plots

BY W. D. JACKSON, ASSISTANT DIRECTOR

DURING the past three years, potato demonstrations have been conducted by the Agricultural Representatives, with the idea of showing the relative value of good seed potatoes from Northern Ontario, Old Ontario, and the Maritime Provinces. Only certified seed was used in these demonstrations, except in connection with Old Ontario Green Mountain and Irish

Cobbler, where common stock and certified seed potatoes were both included. The common stock seed was included in the 1920 demonstrations for the purpose of illustrating the difference in yield between common and certified or selected seed.

The results of the demonstrations with Green Mountain and Irish Cobbler varieties for the last three years are as follows:—

	GREEN MOUNTAIN.			IRISH COBBLER.		
	Northern Ontario.	Maritime.	Old Ontario.	Northern Ontario.	Maritime.	Old Ontario.
1918.....	174.9	141.3	168.0	154.7	148.8	122.8
1919.....	169.5	168.7	166.0	131.8	107.6	120.4
1920.....	218.3	215.7	215.8	198.0	210.1	201.1
3 years' Average.....	187.6	175.2	183.3	161.5	155.5	148.1

Comparative yields from certified seed and common local stock seed are well illustrated by the results of 1920. Green Mountain certified seed from New Ontario gave a yield of 218.3 bushels per acre, as compared with 189.2 bushels per acre from Old Ontario common stock Green Mountain. Maritime Irish Cobbler certified seed gave a yield of 210.1 bushels per acre, as compared with 164.9 bushels per acre from Old Ontario common stock Cobbler.

During the growing season, these demonstration plots, which were located in twelve different counties, were very carefully inspected for disease by a representative of the Department of Botany of the Ontario Agricultural College, and accurate records made of the amount of the various diseases, such as Black Leg, Mosaic, and Leaf Roll.

One bushel of certified seed of each variety and from the various sources, sufficient to plant one-tenth of an acre, was supplied to each Agricultural Re-

presentative where a demonstration was conducted. The Representative arranged to have the demonstration conducted on some good farm with uniform soil conditions, well drained and fertilized. The farmer was given assistance in treating the seed for scab and blackleg before planting, and also in laying out and planting the various plots. The farmer was also given instruction and assistance in spraying during the growing season, and accurate records of the yield of each lot were obtained at time of harvesting.

These demonstrations, in each of the three years, have demonstrated the superiority of New Ontario, or northern-grown seed, over Old Ontario and in most cases over New Brunswick seed. The demonstrations will, however, be continued during 1921 with certified seed, with the object of securing still further information on seed potatoes from different sources, and on diseases of the potato crop.

THE AGRICULTURAL GAZETTE OF CANADA

The following table gives the results of the 1920 demonstrations in detail:—

POTATO DEMONSTRATION, 1920.

COUNTY	GREEN MOUNTAIN				RURAL NEW YORKER		IRISH COBBLER			
	N. Ont.	P. E. I.	Old Ont. Sel.	Old Ont. Common	N. Ont.	Old Ont.	N. Ont.	P. E. I. Sel.	Old Ont.	Old Ont. Common
BRUCE.....	136.5	154.5	242	202	126	132	153	176	181	110
CARLETON.....	193	320	246	216	273	266.6	240	253	226	
HALDIMAND.....	208	186	199	182	189	201	153	151	169	148
HASTINGS.....	323.6	303.5	282	282	282	201.6	292.5	282	221.8	
KENT.....	190.6	238	243	187	152.6	184	207	229	225	169 Sprouted
MIDDLESEX.....	265.6	250	232	200	333	317	266.7	283.3	316.6	246
ONTARIO.....	230.7	228.08	198.5	236.1	193.2	198.5	193.2	220	216	225
PEEL.....	216.6	169.8	180	168	132	162.6	142.6	180.8	122.6	65
RENFREW.....	241	216	222	204	234	240	205	196	196	134
SIMCOE.....	84	68	108	83	48	74.5	93.3	85.3	102	
WELLAND.....	312	240	248	134	256	248	232	254.8	238.1	251.7
TOTALS.....	2401.6	2372.8	2158.5	1892.1	2218.8	2225.8	2178.3	2311.2	2213.1	1319.3
AVERAGE.....	218.3	215.7	215.8	169.2	201.7	202.3	198.0	210.1	201.1	164.9

Bruce Co.—Green Mountain, Old Ontario Selected and Old Ontario Common yield not included in averages.

JUNIOR FARMERS' COMPETITIONS IN ONTARIO

Results of the Profit Competitions in Crops and Live Stock in, 1920

BY W. D. JACKSON, ASSISTANT DIRECTOR OF AGRICULTURAL REPRESENTATIVES

PROFIT competitions with various farm crops and live stock have been conducted for several years by Ontario Junior Farmers under the direct supervision of the Agricultural Representatives. These competitions have been of great value, not only in stimulating interest among the young farmers in field crops and live stock, but also in encouraging them to keep accurate farm records, and to study and follow closely improved methods of management and feeding. All competitions in 1920 were open to young men under 30 years of age, except that winners in previous years were not eligible. Two hundred and forty contestants took part in the various competitions conducted during the past season.

The competitions during 1920 were conducted as follows: Acre Profit competitions with Bailey, Turnips, Corn for

Silage, Sugar Beets, Potatoes, Oats; Dairy Profit competition; Baby Beef competition, and Feeding Hogs for Profit competition. In estimating the cost of production in the Acre Profit competitions, labour, etc., was computed on the following basis: Man labour, 30 cents per hour; horse labour, 15 cents per hour; barnyard manure applied to crop in competition, \$1 per ton, and to the previous crop, 50 cents per ton. The rent of land charged against the crop was one-eighth the selling value of land in the district. Cost of ploughing was figured at a flat rate of \$4 per acre. In these competitions nothing was allowed for overhead expenses such as depreciation on implements, etc.

Values used in compiling the reports are as follows:—

ACRE PROFIT.

Value Seed used in Planting.

Turnips.....	\$1.00 per lb.
Potatoes.....	3.00 per bus.
Oats.....	1.25 "
Barley.....	2.00 "
Corn for silage.....	2.75 "
Sugar beets.....	.15 "

Value Product Harvested.

\$.15 per bushel.
.90 "
.70 "
1.00 "
6.00 per ton.
12.00 "

For Feeding Hogs, Baby Beef and Dairy Profit, value of feed consumed was as follows:—

Ground oats.....	\$60.00 per ton.	Low grade flour or red dog..	\$ 70.00 per ton.
Ground barley.....	55.00 "	Tankage.....	100.00 "
Ground peas.....	90.00 "	Hay.....	18.00 "
Ground rye.....	65.00 "	Alfalfa.....	20.00 "
Ground wheat.....	85.00 "	Straw.....	8.00 "
Ground corn.....	65.00 "	Silage.....	6.00 "
Corn on cob.....	60.00 "	Roots.....	6.00 "
Bran.....	45.00 "	New milk.....	50.00 "
Shorts or middlings.....	52.00 "	Skim milk.....	9.00 "
Oil cake.....	80.00 "	Buttermilk.....	7.00 "
Cotton seed meal.....	84.00 "	Whey.....	4.00 "
Gluten feed.....	72.00 "	Green feed.....	2.00 "

Pasture, \$1 per hog; \$1 per month in Dairy Profit competition and 75 cents per month in Baby Beef competition. Nursing cow, \$6 per month in Baby Beef competition.

In Feeding Hogs for Profit competition, value hogs, live weight, fed and watered, at \$19 per cwt.

In Baby Beef competition, value Baby Beef at 16 cents per pound.

In Dairy Profit competition, Butter Fat valued at 63 cents per pound for first three months and 60 cents per pound for rest of period, and value skim milk at 45 cents per cwt.

The prize for the winner in each competition consisted of railway transportation, board and lodging while attending a two-weeks' course in Agriculture at the Ontario Agricultural College, Guelph, or the Kemptville Agricultural School, Kemptville. The winners in Western and Northern Ontario attend the courses at the Ontario Agricultural College, while the Eastern Ontario winners attend the course at Kemptville Agricultural School. Thirty-one winners in the various competitions conducted during 1920 were provided with transportation to Guelph to attend short courses, and similar provision was made for fifteen winners in Eastern Ontario to attend the Agricultural Short Course at Kemptville.

In each Acre Profit competition the prize was awarded to the competitor showing the largest net profit per acre. In the case of grain crops each contestant competed with field of at least five acres and was permitted to also enter the Standing Field Crop competition, while in the case of roots, potatoes and corn, the area was one acre. The contestants were required to keep accurate records of labour, cost of seed, fertilizer, etc., and in making awards all costs, including cost of hauling from field, were taken into consideration.

In the Baby Beef competition the prize was awarded to the contestant producing the best steer. Each contestant

was required to care for and feed the calf and keep an accurate record of the kind and amount of feed consumed. Only calves born after September 1 were allowed to be entered and the competition concluded in November of the year following.

The awards in the Dairy Profit competition were based on the largest net return from one heifer. The contestant in this case was required to feed and care for the animal, keep accurate records of feed consumed and of the milk production. The contestant also secured a 2-ounce sample of the animal's milk three times per month. These samples were forwarded to the Agricultural Representative to be tested for butter fat. The cost of feed consumed, together with the value of the butter fat and skimmed milk, were taken into consideration in computing the net profit.

The Feeding Hogs for Profit competition awards were made on the following basis: 50 points for highest net profit per cwt. of gain, 25 points for type and finish, and 25 points for best kept records and report. Each contestant was required to feed at least four hogs, keep an accurate record of kind and amount of feed consumed; also to produce accurate information as to date of birth of animals, weight at six weeks of age, when feeding period commenced, and certified weights of hogs at conclusion of feeding period. From the records provided the net profit was computed, points being deducted for hogs over 220 pounds or under 180 pounds live weight.

THE AGRICULTURAL GAZETTE OF CANADA

The following tables furnish a list of the winners and particulars concerning yield, cost of production, and profit:—

FEEDING HOGS FOR PROFIT COMPETITION, 1920.

County and Winner	Length of feeding period	Av. cost of feed per hog	Av. wt. of hogs, live wt.	Av. gain in weight from six weeks of age	Value per hog of gain in weight	Av. net profit per hog	Av. net profit per cwt. of gain
		\$ cts.	lb.	lb.	\$ cts.	\$ cts.	\$ cts.
LANARK. Neil McIntosh, Almonte, No. 5	Apr. 29— Oct. 9.	12 07	186½	165	31 35	19 28	11 68
75% Chester White, 25% Yorkshire.							
MANITOULIN. Stanley Stringer, R.R. 1, Sheguindah.	May 28— Nov. 5.	13 96	209½	187½	35 58	21 62	11 54
Yorkshire-Chester.							
LAMBTON. Elgin V. Fuller, R.R. 4, Watford.	Feb. 2— June 24.	13 59	195	170	32 30	18 71	11 00
Yorkshire.							
KENT. John Langford, Kent Bridge.	June 1st— Nov. 30.	17 29	212½	189	35 91	18 62	9 85
Tamworth and Chester grade.							
LENNOX AND ADDINGTON. Kenneth Hill, Bath, Ontario.	June 8— Nov. 9.	20 70½	234½	226½	43 03½	22 33	9 85
Yorkshire and Berkshire.							
NORFOLK. Jas. Pepper, Simcoe, R.R. 6.	May 19— Nov. 19.	21 08	226	200	38 00	16 92	8 46
Chester-White and Berks.							
WELLAND. Ed. O. Drysdale, Welland, R.R. 3.	May 29— Nov. 26.	20 57½	215	191	36 29	15 71½	8 23
Pure-bred Yorkshire.							
MUSKOKA. Stanley Anderson, Powassan, R.R. 1.	May 31— Sept. 15.	16 97	180	155	29 45	12 48	8 05
Yorkshire and Berkshire.							
ONTARIO. Delson Shier, Cannington.	May 12— Oct. 14.	21 00	201	178½	33 87	12 87	7 22
Yorkshire.							
WATERLOO. Donald Robertson, R.R. 2, Ayr.	May 3— Nov. 23.	22 99½	215	194½	37 00	14 01	7 20
Yorkshire Grade.							
DUNDAS. Geo. B. Baker, Newington.	May 7— Oct. 22.	27 66	175	157	29 83	2 17	1 38
Tamworth, pure-bred.							

THE AGRICULTURAL GAZETTE OF CANADA

BABY BEEF COMPETITION, 1920.

County, Winner and Breed	Date of Birth	Total cost of feed consumed, plus initial value of steer, \$5	Weight of Steer	Value	Net Profit	Total score on conformation, according to score card.
		\$ cts.	lb.	\$ cts.	\$ cts.	
BRANT. Robt. Cochrane, Ayr, R.R. 3.	January	148 20	1000	160 80	\$11 80	.....
HURON. Wilbur Turnbull, Brussels, R.R. 2.	January 19, 1920.	114 98	810	129 60	15 62	86½
Shorthorn grade.						
A. W. Etherington, Hensall, R.R. 1.	Nov. 28, 1919.	109 10	900	144 00	34 90	84¼
Shorthorn.						
LAMBTON. T. Alex Edwards, R.R. 4, Watford.	Dec. 20, 1919.	83 70	660	105 60	21 90	68 5
Aberdeen Angus Grade.						
ONTARIO. Orvan Chambers, Wilfrid.	.....	110 22	940	150 40	40 18	92
WATERLOO. O. E. Lerch, R. R. 2, Preston.	Dec. 2, 1919.	125 81	975	156 00	30 19	91
Shorthorn.						
WELLINGTON. Gordon Saunders, Arthur.	Sept. 8, 1919.	102 90	950	152 00	49 10	75
Shorthorn Grade.						

DAIRY PROFIT COMPETITION, 1920.

County and Winner	Value of Feed	Milk	Fat	Fat	Value	Skim-milk	Value	Net Profit
	\$ cts.	lb.	%	lb.	\$ cts.	lb.	\$ cts.	\$ cts.
LENNOX AND ADDINGTON. Percy Merritt, Sillsville.....	36 69	9,099½	2.83	254.59	156 33	8,844.41	39 79	159 43
DUNDAS. Jas. Deeks, Williamsburg.....	57 40	6,864.3	3.57	245.06	150 40	6,619.24	29 78	122 78
Ayrshire.								
LANSARK. Herb. James, R.R. 2, Almonte....	49 75	6,401	3.1	194.05	119 23	6,206.95	27 92	97 40
Holstein.								
PRESCOTT AND RUSSELL. Gregorie Chatelain, Curran.....	36 16	4,937.5	3.75	181.43	111 19	4,756.07	21 40	96 43
Grade Ayrshire.								

THE AGRICULTURAL GAZETTE OF CANADA

ACRE-PROFIT COMPETITIONS.

POTATOES, 90 CENTS PER BUSHEL.

County.	Winner	Yield	Value	Cost Produce	Profit
Manitoulin.	Alfred Harold Burt, Gore Bay.....	bush. 268	\$ cts. 241 20	\$ cts. 103 72	\$ cts. 274 96
	Sand, following pasture, farmed forty years, sprayed, Davies Warrior, 7 loads manure.				
Middlesex.	Wm. West Taylor, R.R. 1, Ettrick.....	300	270 00	106 20	163 80
	Light loam, following hay, farmed forty years, Paris green, Green Mountains.				
Lanark.	Kenneth Robertson, R.R. 2, Almonte.....	267	240 30	106 08	134 22
	Sandy loam, following hay, farmed four years, Paris green, Green Mountains.				
Norfolk.	Howard Turvey, R.R. 1, Vittoria.....	280	252 00	124 35	127 65
	Clay loam, following corn, farmed 50 years, 250 lb. commercial fertilizer, arsenate of lead, Irish Cobblers.				
Peterboro.	Joseph Carr, R.R. 2, Havelock.....	217	195 30	69 25	126 05
	Sandy loam, following oats. Paris Green, Irish Cobbler.				
Grenville.	Frederick J. Higgs, Kemptville.....	165	148 50	79 95	68 55
	Sandy loam, following potatoes, farmed 30 years, 10 loads barnyard manure, Paris Green, Pioneer Pride.				
Simcoe.	Clifford M. Martin, New Lowell.....	168	151 20	95 85	55 35
	Sandy loam, following oats, farmed 47 years, 16 loads barnyard manure. Paris Green, American Wonder.				

ACRE PROFIT COMPETITIONS.

	BARLEY, \$1.00 PER BUSHEL.	bush.	\$ cts	\$ cts.	\$ cts.
Lennox and Addington.	Allan Craven, No. 1, Bath.....	42	42.00	23.03½	18.96½
	Sandy loam, following potatoes, farmed 100 years, O. A. C., No. 21.				
	TURNIPS, 15c. PER BUSH.				
Muskoka and Parry Sound	Newton Anderson, R.R. No. 4, Powassan.....	818	122 70	71 62	51 08
	Clay loam, following potatoes, farmed 30 years, 12 loads manure, Purple Top Swede.				
York.	Chas. F. Casey, R.R. No. 3, King.....	857	128 35	99 70	28 65
	Clay loam, following oats, farmed 25 years, 25 loads manure, Purple Top Swede.				
	CORN FOR SILAGE, \$6 PER TON.				
Huron.	Cecil J. Stewart, R.R. No. 1, Kirkton.....	26 tons.	156 00	47 78	108 22
	Clay loam, following corn, farmed 50 years, 10 loads manure, Early Imperial Leaming, 3 parts to 1 of White Cap.				
Peterborough	Russell Jenkins, R.R. No. 1, Norwood.....	23 "	138 00	40 73	97 27
	Clay loam, following corn, farmed 60 years, 10 loads manure, Big Crop ensilage corn.				
	SUGAR BEETS, \$12 PER TON.				
Kent.	Geo. E. Sherman, R.R. No. 1, Northwood.....	28 tons, 1,121 lbs.	342 72	132 66	210 06
	Clay, following tobacco, farmed 50 years, 8 loads manure.				

THE AGRICULTURAL GAZETTE OF CANADA

ACRE PROFIT COMPETITIONS.

County	Winner	Yield	Value	Cost. Produce	Profit
OATS, 70c. PER BUSHEL					
Frontenac	John Watts, Wolfe Island.....	bush. 95	\$ cts. 66 50	\$ cts. 23 45	\$ cts. 43 05
	Black loam, following oats, farmed 50 years, Banner.				
Wentworth.	Daniel T. Fletcher, R.R. No. 1, Hannon	90	63 00	25 50	37 50
	Clay loam, following barley and blue grass, half each, farmed 40 years.				
Lennox and Addington.	D. R. Sharpe, R.R. No. 2, Napanee.....	77 11 lbs.	54 13	20 25	33 88
	Black clay, following summer fallow, farmed 80 years, Banner.				
Wentworth (2nd prize)	Walter Wilson, R.R. No. 4, Hamilton.....	80	56 00	24 55	31 45
	R.R. No. 4, Hamilton.....				
	Clay loam, following corn and potatoes, farmed 60 years, Scottish Chief.				
Middlesex.	Harold Pack, R.R. No. 1, Byron.....	80½	56 35	25 32	31 03
	Clay loam, following potatoes, formaldehyde, O. A. C., 72, farmed 75 years.				
Lambton.	Russell C. Parker, R.R. No. 8, Watford.....	67 23 lbs.	47 37	25 78	21 59
	Sand following corn, farmed 35 years, Banner.				
Wellington.	Harvey Logghead, R.R. No. 1, Belwood.....	55	38 50	17 10	21 20
Elgin.	Cecil Bowen, Aylmer.....	75¼/17	52 67	31 75	20 91½
	Clay and sandy loam, following corn, farmed 30 years, Swedish Giant.				
Welland.	Leo. B. Haist, No. 5, Fenwick.....	62	43 40	23 74	19 66
	Sand and black loam, following corn and pasture, farmed 75 years, O.A.C. 72.				
Norfolk.	Max Everett, R.R. No. 2, Simcoe.....	69½	48 72	33 52	15 20
	Sandy loam, following corn, farmed 50 years, Banner oats.				
Prescott and Russell.	Simon Bertrand, R.R. No. 2, L'Orignal.....	49	34 30	24 02	10 28
	Clay loam, following Oats, farmed 30 years, Banner.				

JUNIOR FARMERS FROM ONTARIO VISIT THE INTERNATIONAL LIVE STOCK SHOW

Winners of Judging Competitions Given a Trip to Chicago.

A PARTY of fourteen junior farmers from various parts of Ontario visited Chicago and the International Live Stock Show in December. The members of the party, with one exception, were winners in the Inter-

County Judging Competitions at Guelph and Ottawa, local County Judging Competitions, or winning coaches of School Fair Judging teams. The prize in each case consisted of expenses for the trip to Chicago.

THE AGRICULTURAL GAZETTE OF CANADA

The prize winners, the competitions in which they won their prizes and the donors, are as follows:—

NAME	COMPETITION	DONOR
Burns McCorquodale, Embro...	Inter-County Live Stock Judging Competition Championship Contest. High Man on Western Ontario team.	Armour's Bureau of Agricultural Research and Economics, Chicago, Ill.
Echlin Croskery, Kinburn....	Same as Above. High Man on Eastern Ontario Team...	Armour's Bureau of Agricultural Research and Economics, Chicago, Ill.
Pringle Brown, Ayr.....	Brant County Judging Competition	Canadian Packing Co., Brantford.
Frank Town, Woodstock, No. 1.	Oxford County Judging Competition	Jas. Harris, Harris Abattoir Company.
Howard Hallock, Woodstock, No. 6...	Oxford County Judging Competition	Jas. Harris, Harris Abattoir Company.
W. G. Shaw, R.R. 2, Mono Road.	Peel County Judging Competition	Local Contribution.
G. O. Kirk, R.R. No. 1, Inglewood...	Peel County Judging Competition	Local Contribution.
Harvey Hallman, R.R. 1, Ayr.	Waterloo County Judging Competition	Harris Abattoir.
Fred M. Snyder, R.R. 1, Waterloo...	Waterloo County Judging Competition	Harris Abattoir.
Willie Watson, R.R. 1, Troy..	Wentworth County Judging Competition	Junior Farmers' Improvement Ass'n.
Norman Bell, R.R.1, Glanford Station..	Wentworth County Judging Competition	Royal Bank.
Jas. Oliver, Kintore.....	Coach for School Fair Judging Team.....	Rural Service Department, Merchants' Bank.
Robert Calder, Kintore.....	Coach School Fair Judging Team.....	By Friends.
W. J. McCorquodale, Embro...	Financed own trip..	

Armour's Bureau of Agricultural Research and Economics, which paid the expenses of two of the party, very kindly offered to entertain the Ontario boys during their stay in Chicago, as a part of Armour's Club Tour party, consisting of about 500 winners in Boys' and Girls' Club work throughout the United States, which was visiting Chicago at the same time. Upon arrival at Chicago, therefore, the Ontario boys joined the Armour Junior Club Tour party and were shown every consideration during the entire trip. At the Junior Club Rally and Reception the boys from Ontario were given a very enthusiastic reception, not only by the officials in charge of the Junior Club Tour, but also by the State Club leaders and Boys' and Girls' Club members.

Visits were made to the International Live Stock Show, Armour's Meat Packing and By-products plant, the Art Institute, Marshall Field's Department

Store, the financial district, Lincoln Park, the Zoo, and the McCormick plant and were entertained in the Armour Gymnasium by the Armour Dramatic Club, Orchestra and Glee Club. Every effort was made by Mr. G. L. Noble of Armour's Bureau of Agricultural Research and Economics to see that every person in the party was shown every courtesy and consideration.

At various times during the week, addresses were delivered to the party by such prominent United States officials as Secretary for Agriculture Meredith; J. R. Howard, President American Farm Bureau Federation; Geo. E. Farrell, in charge of Boys' and Girls' Club Work in Northern and Western States; O. H. Benson of Eastern States League and others.

The educational value of this trip cannot be over-estimated and will doubtless have far-reaching effects. The boys

making this trip, seeing Chicago, its industrial plants and the International Live Stock Show, received not only an education but an inspiration which will be reflected in the Junior Farmers' movement throughout Ontario. These young men have already been called

upon to address Junior Farmers' meetings on their trip and its educational value. County Judging Competitions will undoubtedly increase, and it is expected that arrangements will have to be made for a much larger party this year.

SHEEP IMPROVEMENT WORK IN QUEBEC

BY ALPHONSE LAFLAMME, DISTRICT AGRONOMIST, BEAUCE COUNTY

THE work done in Beauce county, Quebec, towards the improvement of sheep raising was as successful as could be desired. Various means were taken to make the farmers realize the importance of this movement. Series of lectures were given explaining the advantages that would result from the improvement of the flocks. It was necessary in some cases to go and see the farmers at home in order to give them fuller and more definite information. These home visits were very successful, and are regarded as one of the best methods for obtaining results. Once the farmers had fully understood the advantages of such a move, general meetings were called and syndicates of 25 or 30 farmers were formed. One of the farmers was selected and sent to purchase sheep with the help of an officer of the Dominion Department of Agriculture. Generally when the carloads of sheep arrive, there is no difficulty in disposing of them. Most farmers like to secure choice animals, with which they may compete at competitions and at fairs. The question of prices

takes a secondary importance when animals are really good. Black-faced breeds are beginning to attract the attention of the farmers, and any prejudice that may have been entertained against such breeds in the past is rapidly disappearing. The Leicester breed has been very common in Beauce for a number of years. Other breeds were rather scarce before this year, but it may be said that the "Down" breeds will rapidly become common in this district. Farmers are convinced that they are the best breeds for the meat as well as for the wool. We are now trying to get the syndicates in good working order. Information on the care of the flock is given to the farmers. It must be admitted that the farmers' sheepfolds are not perfect, but I trust the feeding competition organized by the Dominion and Provincial Departments of Agriculture will help to improve the situation.

As regards the sale of wool through the Co-operative Wool Grower's Association some work has been done in this direction; 5,000 pounds were shipped last year and I think a larger quantity will be shipped in the future.

AN AGRICULTURAL SURVEY IN MANITOBA

An agricultural survey of Manitoba will be undertaken by the Department of Agriculture and the Agricultural College. It is proposed to find out the exact condition of agriculture in the province, and on this information, devise remedies that will put the industry on a better and more profitable basis. Fore-

most of the farm problems of Manitoba is the situation in the extreme southwestern area. Crops in that area have been a partial failure for several years, rust, drought, weeds and grasshoppers combining to create conditions under which growing anything was a continual and rarely successful struggle.

SASKATCHEWAN BETTER BULL CAMPAIGN

Education to be Followed by Legislation

BY J. G. ROBERTSON, LIVE STOCK COMMISSIONER

At the request of and in conjunction with the Saskatchewan Cattle Breeders' Association, the provincial Department of Agriculture through the Live Stock Branch propose starting a campaign for the improvement of the sires that are used for the production of live stock in Saskatchewan. In order to manage the campaign properly, it will be handled by one member of the staff of the Live Stock Branch who will devote all his time to this work, and who will be directly responsible to the Live Stock Commissioner, who is also the secretary of the Cattle Breeders' Association.

There is no doubt as to the need of such a campaign, for with the large increase in cattle production which this province has experienced, large numbers of cattle are now being raised by men who have little experience in the business, and who apparently do not appreciate the value of a good, pure bred sire. Statistics show that there are nearly 30,000 bulls in Saskatchewan and it is estimated that a very large proportion of these are grade or scrub animals. Efforts

will be made in this campaign by getting in touch with the owners of such bulls to induce them to replace them with pure-bred animals. If good results can be obtained, in two or three years time there is no doubt that the quality of the beef cattle shipped from Saskatchewan farms will be increased in value by at least \$1,000,000.

It is proposed to conduct the campaign on a basis of publicity and education for the first year at least. After considerable work has been done by such methods through the Press, the agricultural societies, the municipalities, co-operative shipping associations, and through meetings held at various points, it is believed that the province will be ready for legislation, the object of which will be to encourage and bonus the keeping of first class sires, and also to make it an expensive luxury to be the owner of a scrub bull. This legislation has not been promised by the government, but the Minister has assured the Cattle Breeders' Association that he is very much in sympathy with the campaign.

DAIRYING AND FIELD HUSBANDRY SPECIAL TRAIN FOR SASKATCHEWAN

The Department of Agriculture co-operating with the Canadian Pacific Railway Company and the Extension Department of the University of Saskatchewan, is this year operating two agricultural instruction cars over the lines of the Canadian Pacific Railway in the South-western part of the province. The series of meetings will begin on January 17, and continue until about the end of March.

During several winters past the Dairy Branch of the Department of Agriculture has operated a special dairy instruction car over the different lines of rail-

way in the province. This year in addition to the car for dairying work, a second car is being added to deal with field husbandry questions, and more particularly to discuss and bring before the people in south-western Saskatchewan the work and findings of the Better Farming Commission. This Commission was appointed by the Saskatchewan Government following the Dry Farming Conference held at Swift Current last summer. Extensive investigational work has been carried on by the Commission and the results, while of great interest

and value to all engaged in dry farming work, is of particular interest to the south-western portion of the province.

The special dairy car will be equipped with stereopticon, and lantern slides will be used to illustrate practically all phases of dairying work. A moving picture machine will also be carried in this car and films illustrating various phases of development in both the dairying and live stock industries will be exhibited. The lectures in the field husbandry car,

while dealing with general problems of crop production, will give special attention to matters of farm management, rotation and growing of crops, more directly relating to dairying and live stock.

The C.P.R. are furnishing the two lecture coaches and a third car for the accommodation of the speakers free of charge, while the Department of Agriculture and the Extension Department of the University are furnishing the necessary equipment and the speakers.

EXHIBIT OF ALBERTA BRED AND FED STEERS AT THE CHICAGO INTERNATIONAL

THE College of Agriculture of the University of Alberta made an exhibit of fifteen Alberta-bred and fed steers at the International Live Stock Exhibition, Chicago, in 1920, in order to advertise in the United States the class of cattle bred in Western Canada.

Leading beef breeders in Alberta agreed some time ago to donate calves to the provincial university to be used in class-room judging work. It was believed that this work could be made more valuable to the students if, instead of using ordinary steers, animals of higher merit could be obtained. The cost of labour, feed and housing would be practically the same, but sufficient funds

were not available to enable the institution to buy the best animals. Calves were offered by thirty-two breeders. The agreement reached was that the university should prepare and exhibit the animals in such a way as would prove an advertisement to the province and to the donors.

The calves were received during the summer and fall of 1919. Grade calves were not barred, but pure bred were preferred. They were available for class-room work for two seasons; an exhibit was then made at the 1920 Chicago International, five animals from each of the leading beef breeds being selected by committees appointed by the Breed Associations.

Particulars as to the exhibit will be found in the following statement:—

STERS FITTED FOR 1920 INTERNATIONAL

Breed	Breeder	Date of Birth	Date Shipped to University	Weight August 1 1919	Weight Nov. 1 1920	Gain	Gain per Month	Show Age
1. Hereford.	Curtice Cattle Co.	Jan. 22, 1919.	July, 1919.	535	1545	1010	67.33	Junior yearling.
2. Hereford.	John McD. Davidson.	May 26, 1919.	July, 1919.	255	1330	1075	71.66	Junior yearling.
3. Hereford.	Pym Bros.	April 18, 1919.	July, 1919.	340	1355	1015	67.66	Junior yearling.
4. Hereford.	S. M. Mace.	April 6, 1919.	July, 1919.	355	1370	1015	67.66	Junior yearling.
5. Hereford.	V. W. Smith.	Jan. 6, 1919.	July, 1919.	435	1310	875	58.33	Junior yearling.
6. Hereford.	John Wilson.	May, 14, 1919.	Nov. 1919.	Dec. 1, 1919 April 5, 1920	1245	760	69.09	Junior yearling.
7. Hereford.	Frank Collicut.	Jan. 15, 1919.	April, 1920.	1050	1350	300	*43.90	Junior yearling.
8. Aberdeen Angus.	C. H. Richardson.	Nov. 20, 1918.	July, 1919.	515	1475	960	64.00	Senior yearling.
9. Aberdeen Angus.	A. E. Noad.	Mar. 15, 1919.	July, 1919.	400	1390	990	66.00	Junior yearling.
10. Aberdeen Angus.	Chas. Ellett.	May 1, 1919.	July, 1919.	310	1230	920	61.33	Junior yearling.
11. (Grade) Aberdeen Angus.	Canada Land and Irrigation Co.	April 15, 1919.	July, 1919.	315	1225	910	60.66	Junior yearling.
12. (Grade) Aberdeen Angus.	J. D. McGregor.	April 24, 1919.	July, 1919.	285	1160	875	58.33	Junior yearling.
13. Aberdeen Angus.	Lofthus and Dickson.	Jan. 29, 1920.	June, 1920.	July 1, 1920	810	405	**101.25	Junior calf.
14. Shorthorn.	University of Alta.	May 23 1919.	Oct., 1919.	230	1350	1120	74.66	Junior yearling.
15. (Grade) Shorthorn.	Hon. Duncan Marshall.	Sept. 3, 1919.	Oct., 1919.	Nov. 1, 1919	1190	1000	**83.33	Senior calf.

* More mature when received—hence lower gains would be expected.

** Heaviest gains would be expected with younger calves.

The exhibit won second prize for herd of five steers, any age or breed,—Clay Robinson Special, open to all Colleges

breed; 3rd, pure-bred junior Angus calf; 5th, senior yearling, pure-bred Angus class; 7th, open junior yearling pure



PRIZE WINNING HERD OF ALBERTA BRED STEERS AT THE CHICAGO INTERNATIONAL

and Experimental Stations. In the pure-bred junior Hereford class, six animals were placed in the top twenty. Other winnings were: 1st, junior yearling, any

bred Hereford class; 4th, Clay Robinson Special, junior yearling, any breed, in herd of five head, and 8th in Junior yearling shorthorn class.

NEW BRUNSWICK'S MINISTER OF AGRICULTURE

THE HON. D. W. MERSEREAU

New Brunswick's new Minister of Agriculture, Hon. D. W. Mersereau, the son of the late Leonard Mersereau, of Loyalist stock, was born at Fredericton Junction, Sunbury county, N.B., in 1870. He was educated in the Fredericton Junction grammar school.

Prior to entering provincial politics, he occupied a prominent place in municipal politics in his native county, representing the parish of Gladstone as county councillor for several years. He was employed in the Canadian Pacific Railway telegraph maintenance department

for upwards of twenty years and in that capacity had the reputation of bringing good judgment to bear on the work as well as being an exceptionally good handler of men, a characteristic that tended for loyal, efficient subordinates. He has been chairman of the Agricultural Committee of the Legislature where he showed marked ability. He owns and operates a farm at Fredericton Junction, where mixed farming is carried on. He has a good grasp of the needs of the farmers of New Brunswick and in his present capacity will have a good

opportunity to establish progressive measures for their benefit.

As a man who has had considerable experience in the judicious handling of men, he will undoubtedly be able to

strengthen and reorganize his staff, giving them a measure of free hand, which is absolutely essential for the success of any organization and the development of initiative in its members.

PRODUCTION OF PULVERIZED LIMESTONE IN NEW BRUNSWICK

BY O. C. HICKS, B.S.A., INSTRUCTOR OF SOILS AND CROPS

To meet the farmer half-way in his efforts to maintain soil fertility and continue crop production, the provincial Department of Agriculture established a limestone grinding factory at Brookville, four miles from the city of St. John, to supply agricultural lime at a moderate price.

More than fifteen hundred tons of pulverized limestone were sold and shipped to farmers in every county of the province during the fall of 1920. The daily shipment is now forty tons, with the prospect of an increased output as spring approaches.

The grinding factory is a three-story building, modern in equipment. The quarry-face abuts the factory and a spur railway siding permits loading of the cars directly from the pulverizer. The rock-reducing machinery consists of a large jaw crusher for coarse crushing, a ring-roll pulverizing mill, and steel equipment for screening, elevating, conveying, weighing and sacking. A seventy-five horse-power electric motor supplies the power.

The finely-powdered condition of the product is shown by the following analysis by Dr. F. T. Shutt, Dominion Chemist:—

Passes 10-mesh sieve (100 meshes per square inch), 100 per cent.

Passes 20-mesh sieve (400 meshes per square inch), 99.7 per cent.

Passes 60-mesh sieve (3,600 meshes per square inch), 7.40 per cent.

Passes 80-mesh sieve (6,400 meshes per square inch), 62.1 per cent.

The department will carry on, in 1921, a comprehensive series of co-operative experiments in liming land to demonstrate the value of pulverized raw limestone rock in the production of hay, clover, grain, and mangolds, and in the eradication of the causal organism of club root.

Now that a favourable opportunity offers for securing this much-needed ingredient for the maintenance of soil fertility, at \$3 per ton, bulk, carlots, f.o.b. Brookville, and at special low railway rates to points within the province, it is expected that the utilization of this home product will become widespread.

THE DAIRY SITUATION IN NEW BRUNSWICK

BY GEORGE THIMENS, DAIRY INSTRUCTOR

The dairy industry in New Brunswick established a new record in 1920, both in the quantity of milk produced, and in the value of the product. Formerly, the development of the dairy industry of the province was chiefly towards cheese making, but during the past few years

the manufacture of butter has been increased. With well-equipped central creameries started throughout the province, the making of the butter is likely to be carried on more extensively. A new central creamery was started last

summer at Fredericton known as the Farmers' Co-operative Dairy Company. This concern has an up-to-date equipment for both butter and ice cream manufacture, and has made a successful start, although it was quite late in the month of June before it began operations. December showed 112 patrons supplying cream to this creamery.

The Farmers' Co-operative Creamery Company at Moncton also made remarkable progress. The patrons supplying cream increased in number from 602 in 1919 to 990 in 1920, and it became necessary to enlarge the whole plant in order to take care of the business. A chemical cold storage plant is being installed. This is now the most flourishing creamery in the maritime provinces. The Sussex Cheese and Butter Company at Sussex found it necessary to instal two 400-gallon pasteurizers in order to take care of all the cream being received. At the Madawaska Creamery at St. Hilaire, under the control of the provincial Department of Agriculture, the output was also gratifying. As soon as conditions will permit, another central creamery will be organized in Gloucester county

to take care of that section of the province. With the establishment of these large central creameries the province will soon be on a sound basis to take care of the industry throughout the dairy sections.

Although the output of New Brunswick cheese decreased somewhat during last year, we must not conclude from this that the dairy industry is declining. The truth is that the milk producers are finding a more profitable market for their product in other lines of manufacture, a considerable proportion of the milk being used in the cities, and a large amount of cream employed in the making of ice cream.

The following table shows the quantity and value of cheese and butter for 1920 compared with 1919:—

CHEESE.			
	Lb.	Value.	
1919..	1,256,388	\$347,772	00
1920..	1,213,904	331,290	00
BUTTER.			
1919..	915,816	504,602	00
1920..	1,036,032	626,156	00
1920 Ice cream, estimate at ..		500,000	00

CO-OPERATIVE MARKETING PRINCE EDWARD ISLAND

IN the spring of 1913, the farmers of Prince Edward Island became interested in what eventually developed into a concerted and successful effort to market their eggs co-operatively. Some forty local associations or Egg Circles were organized, these forming the nucleus of the Prince Edward Island Co-operative Egg and Poultry Association, which was incorporated under an Act passed by the provincial legislature early in 1914. In 1917, the constitution was amended to provide among other things that each local egg circle—the organization of which had been approved by the executive of the central association

and registered on the books of the association—should have the full powers of a separate corporation, constituting federated branches of the central association.

The success of this movement encouraged the producers of Prince Edward Island to extend their efforts to other lines of produce, and to this end on December 17, 1919, The Canada Farm Products was incorporated. The organization that receives and markets the eggs of the circles is a federation of these circles. Each collects its own membership fees, 25 per cent of which is paid into the central organization.

Each egg circle engages its own egg collector, who undertakes to collect the eggs of local members at least once a week during the summer months, pack them in such a manner as to ensure their identity, ship them to the central candling station, and make returns to the members on the basis of returns received from the central warehouse.

Egg cases are supplied by the central organization, and to provide for the identification of ownership, the eggs are packed, as collected, by a method known as "The Egg Case Plan," a plan or chart of the interior of the egg case which is carefully marked off as the eggs are packed and each member's registered number in the local association marked on that part of the chart represented the exact location of his eggs in the case.

This chart is tacked into the inside of the cover of the case, so that the eggs when received at the candling station may be candled, graded and credited to the member to whom they belong. When collecting the eggs, the collector gives a receipt on an ordinary counter check, and in shipping the eggs, makes out his invoices from these checks and the egg case plans.

The central candling and grading station located in Charlottetown is a large building with a floor space of more than 12,000 square feet. A staff of fifteen candlers and other trained men under the supervision of an expert manager is employed.

The returns to members are made on a quality basis, the Canadian standards for eggs being the basis, three grades being made which are known as extras, firsts and seconds. Eggs grading below seconds, provided they are wholesome, are sold to the baking and confectionery trades. The system of payment to members is not entirely uniform, and while, as a general rule, members are paid weekly, in some particular instances they are paid monthly. The cash payments made to members constitute a percentage of the value of their shipments, the balances retained being paid periodically.

After the eggs have been candled, graded, and repacked at the central warehouse they are shipped to the leading surrounding markets such as Montreal and other Eastern Canadian cities, a considerable business also being done with the New England States.

The shipments are marketed under the brand of the Central Association, and experience has led these markets to place confidence in the brand. The central association, which is run as a non-profit concern, merely acts as a marketing medium for its members, but to meet general expenses and salaries, a portion of the value of eggs handled is withheld from payments made to members, and at a stated date, once a year, all accounts are balanced, members being credited with any amounts that may be due to them as a result of the year's business.

The amount available for distribution at the end of 1919 was \$47,000, forty per cent of which was distributed to the members, the balance being retained as working capital, and capital stock issued for this remaining sixty per cent. The business details of local circles are arranged at local meetings and, once a year, an annual meeting of delegates representing all the units in the federation is held in Charlottetown.

With a view to improving the poultry stock in the country, the organization distributes day-old chicks from approved breeding stock and, in 1919, seventeen thousand chicks were distributed among members, these chicks being hatched at the central hatchery of the Association in Charlottetown from eggs produced by government inspected pure bred flocks.

Another valuable service now being rendered to producers by this association is the operating of a poultry killing station during two periods of the year, first in August, when hens and broilers are handled, and again from November until Christmas, when large quantities of cockerels are killed and marketed. It is hoped to extend this department of the business.

SHORT COURSES AND EXTENSION SCHOOLS

HOW ORGANIZED AND CONDUCTED

Information as to the System Followed in a Number of Provinces in Carrying on this Form of Work

ONTARIO'S SHORT COURSES IN AGRICULTURE

BY R. S. DUNCAN, B.S.A., DIRECTOR OF AGRICULTURAL REPRESENTATIVES

COURSES in practical agriculture conducted during the winter months have become quite a feature of Agricultural Representative work. These courses are intended primarily for farm boys from sixteen to thirty years of age, and are held at different points in each county each year and last from four to six weeks.

The courses in the western portion of the province—from Durham and Victoria and West,—commenced on January 4, whereas, those in the East did not commence until January 25, the week following the Ottawa Winter Fair.

The department supplied an assistant, either a graduate or an undergraduate of the Ontario Agricultural College, between two counties, whose time was divided equally in lecturing on the same subjects at each class. In addition to such assistance, the Representatives were given further help in the so-called "Special Lecturers" for such subjects as veterinary science, live stock, poultry, fruit and vegetable growing, bee-keeping, seeds, soils and drainage, plant diseases, farm management, marketing and co-operation, and farm power. Specialists in each of the above subjects were eagerly listened to, not only by those who were considered among the regularly enrolled students, but by farmers and others in the locality where the courses were held.

The work at headquarters consisted in organizing the classes on a fairly uniform basis, securing assistants, arranging for special lecturers, obtaining dem-

onstration material, and planning a reception and entertainment for some of the classes when they visited Toronto towards the conclusion of the courses.

The local organization is left entirely in the hands of the Agricultural Representatives. They naturally secure the co-operation of the township, village or town councils in whose municipality the courses are held, which body invariably supplies a hall, free, in which to conduct the classes. All local organizations connected with the agricultural community are asked to assist in making the course a success. Meetings are held, committees are appointed, calendars and advertising matter are sent out to bring the matter to the attention of the local people—"The farm boys' opportunity."

The courses are made as practical as possible. The lectures are supplemented by demonstrations and are varied in each county to suit the special needs of the locality. The following is taken at random from one of the calendars as issued and is a fairly comprehensive outline of the courses as a whole:—

Live Stock.—A study of the types and characteristics of the different breeds of farm animals. Visits will be made to local stock farms where practical work will be taken in judging cattle, horses, sheep and swine.

Feeds and Feeding.—A study of the feeding value of foodstuffs used on the farm; their adaptability to different classes of stock; the working out of balanced rations; care and management of farm animals.

Field Crops.—A study of the principal field crops of the county with practice in judging seeds of all kinds; principles of crop improvement; rotation of crops; the results of experimental work at Guelph and Ottawa.

Dairying.—Feeding, care and management of dairy cows; improvement of the dairy herd; care and handling of milk and cream; practical work in testing milk and cream; the process of butter-making.

Poultry.—Characteristics of the most useful breeds of farm poultry; feeding and general management; poultry houses; egg production and rearing of young chickens naturally and artificially.

Agricultural Botany.—Identification and eradication of weeds and weed seeds; the Seed Control Act and its application; plant structures; the relation of plants to soil, air, light, temperature and moisture.

Insects and Fungous Diseases.—Study of injurious insects of orchard, garden and field; their habits and injuries; best method of prevention. Study of fungous diseases of farm crops; rusts, smuts, blights, rots and scabs.

Sprays and Spraying.—The preparation and application of sprays and solutions for treatment of seed; spraying machinery.

Soils.—Study of the origin of soils; different types of soil; essential constituents, soils in relation to moisture, air, heat; methods of cultivation; the principles of tile drainage; methods of putting in a system of drains; benefits to be derived from drainage.

Manures and Fertilizers.—Care and application of barnyard manure; commercial fertilizers, their nature and use.

Fruit and Vegetable Growing.—The fruits suited to the district; methods of propagation, planting, pruning, cultivation, care; practical lessons in grafting and pruning; the farmers' vegetable garden; hot beds; canning crops.

Bacteriology.—The study of bacteria in relation to agriculture; plant and animal disease and sanitation; bacteria in the soil, in milk, in silage, etc.

Farm Book-keeping.—Farm records and accounts.

Marketing and Co-operation.—The value of proper preparation and packing of farm products; how to co-operate in marketing and its value to the farmer.

Lectures and practical work are given from 9 a.m. to 4 p.m. each week day, except Saturday. Practical work is given in the testing of milk and cream, in pruning bush and tree fruits, identification of weeds and weed seeds, shearing sheep and the grading of wool, judging of grain, clover seeds, roots, potatoes, corn and vegetables, and the judging of all classes of live stock.

A Literary Society is formed for the purpose of developing latent talent. Debates are held, impromptu speeches are given, and an opportunity is given each member of the class to get practice in the art of public speaking.

The classes conducted in counties close to and adjoining York county have visited Toronto, where they had the privilege of inspecting the Union Stock Yards, the Packing Plants or Abattoirs, Parliament Buildings, Massey-Harris Co., University buildings, and one of the large dairy plants. During the month of January, nine Agricultural Representatives brought their class to the city and over 300 farm boys made a tour of inspection of some of the more important institutions and plants.

The attendance of farm boys at the courses this winter, particularly in Western Ontario, has never been better. Of the twenty-five courses which were concluded by the end of January, there was an average attendance of twenty-seven—the lowest being ten and the highest seventy-one. During the past ten years 311 courses in practical agriculture were conducted by the Agricultural Representatives with a total attendance of 7,225 farm boys, or an average for each course each year of twenty-three.

NOVA SCOTIA SHORT COURSES

BY DR. M. CUMMING, PRINCIPAL,
AGRICULTURAL COLLEGE, TRURO

AS there is not a large staff in the Nova Scotia Department of Agriculture, we have to arrange so as to fit in with the duties of the members of the college staff who have, up to the present time, given most of the instruction at the short courses, and our plans have been considerably modified due to this consideration.

Our usual procedure is to hold a short course of from two to three days' duration, occasionally more. Until three years ago, when duties growing out of the war made it impossible for the members of our staff to give the necessary time, we were in the habit of conducting from six to eight short courses at various points in the province. The procedure was to draw up a complete programme and print same, and then to send a representative from the college staff to the community where the short course was to be held several days in advance and get him to make all necessary arrangements in connection with securing a building, live stock and equipment necessary to make the course successful. Very fortunately, in seven counties of the province, buildings have been constructed since the year 1911 with special reference to affording the necessary accommodation for short courses, and this has materially facilitated our programme. In this connection I may state that if our department were in a position to assist rural communities in the further establishment of community halls, I should like to have the plans for these of such a character as to lend themselves to the purpose of conducting short courses. The most satisfactory building I have ever seen for this purpose is the so-called Demonstration Building at Lawrencetown, Nova Scotia, an account of which appeared in the January-February issue of *The Agricultural Gazette*.

We have always advertised the short course two or more weeks in advance in the local press and by means of circulars, and ever since they have been established have had an average enrolment in every class of considerably over 100. I may further add that, despite all the arrangements that may be made by the departmental officials, our courses have seldom proved a success unless a live group of local men took personal interest in the matter and devoted their energies to working up an attendance.

THE NEW BRUNSWICK SYSTEM

O. C. HICKS, B.S.A., INSTRUCTOR OF SOILS
AND CROPS

In this province short courses are carried on through funds provided by the Dominion Agricultural Instruction Act, and are organized and directed by an official of the Department of Agriculture.

The young men's courses of two weeks' duration are held simultaneously at local centres in different counties, organized and directed by the local Agricultural Representative who has the assistance of members of the staff of the department. Each instructor carries a travelling equipment of demonstration and illustration material from one school to another. Stereopticons are provided for each Representative's office, and each division of the department has an assortment of slides pertaining to its work. In the French-speaking districts instructors who speak in French are provided.

The places of meeting are the halls which form a part of the Agricultural Representative quarters, or a suitable building placed at the disposal of the Department by an agricultural society. The provision made for demonstrating on live-stock is to convey the students to a nearby stock farm judging and discussion takes place out of doors.

The courses are general in character as at none of the centres is agriculture so specialized that any special need

exists. The daily sessions are for class work only and are divided into two morning and afternoon periods, all periods on any one day being devoted to one branch of agriculture. To sustain interest in the animal husbandry part of the course, a judging contest between teams of three students representing each school was promised. The contest was held at the Dominion Experimental Farm at Nappan in July, the travelling expenses of the contestants being paid by the department.

A special school or course of instruction for young men in dairying is conducted in affiliation with the departments of agriculture of Nova Scotia and Prince Edward Island at the Agricultural College, Truro, N.S.

An Apple Packing School organized at a fruit-growing centre by the horticulturist was well attended by enthusiastic growers.

Short courses in Household Science are conducted by the Women's Institute Division in both English and French-speaking districts of the province. Classes in Cookery, Sewing, Millinery, and Nursing are held daily in centres convenient to rural and village residents.

EXTENSION SCHOOLS IN MANITOBA

BY S. T. NEWTON, SUPERINTENDENT,
EXTENSION SERVICE

Several different kinds of extension schools are carried on in Manitoba, namely, Gas Engine, Live Stock, Field Crops, Dairying, Poultry Raising, Dressmaking, Millinery and Cookery. Of these the greatest demand is for Gas Engines, Dressmaking and Millinery.

During the winter months one member of the extension staff, usually the assistant superintendent, devotes practically all his time to the direction of the short courses. The plan followed in making up the list of short courses to be held during the following winter is, first, to

have the extension man in charge of each short course this year to make careful enquiries during the time he is there as to the needs of the district on the following year, and then make recommendations as to the kind of course that will likely prove of most service. Second, immediately after the course is held a letter is sent to the local committee asking their opinion as to the advisability of booking them for a short course during the following season. Third, circular letters outlining proposed courses are sent to each of the 250 rural organizations with which the extension service is in close touch. In the fall the full schedule is mimeographed and copies are sent to each secretary, to make sure that during the summer conditions have not arisen to make the holding of a course inadvisable, and to enable the local committee to get in touch with other local organizations and see that the dates do not conflict with local events. The local committee is encouraged to do as much advertising as possible, but it has been found that if posters and other advertising matter is not sent out in good time from the extension office, the advertising will be delayed too long to ensure success.

Bulletins are sent out on the subjects taken at the short courses for each member of the class, so that they will be available as soon as the class opens.

As a general rule each course extends over a period of five days. Much better results would be obtained in the case of the gas engine courses if they continued for two weeks.

For the gas engine courses, the local committee is expected to provide several small stationary engines of different makes, at least two tractors, a two-cylinder and a four-cylinder, and as many engine parts as can be conveniently gathered. The local committee also provides a good, roomy, heated garage, and a lecture room. The lecturers take with them engine parts such as magnetos, carburetors, charts, and lantern slides.

For Dressmaking, those who attend the classes provide all the materials required, including patterns. For millinery, it is necessary for the instructors to take with them a good supply of all kinds of millinery supplies, as this material can rarely be obtained locally. The material used is paid for by those making hats, at regular wholesale prices plus a small percentage added to cover express, shrinkage, etc.

Local Organizations Assist

In organizing an extension school, the initiative is usually taken by a local organization such as the Agricultural Society, Women's Institute, U.F.M., etc. Whatever organization takes the lead is encouraged to co-operate with all other local organizations, and a management committee is formed with representatives from each, and this committee takes full charge of all local arrangements, collects whatever fees are needed to defray expenses—for gas engines, from \$1.50 to \$2, and for dressmaking and millinery about 25 cents each.

For the Gas Engine courses three instructors are provided if the enrolment is 50 or over. For the agricultural courses two lecturers are generally arranged for, and in the case of the home economics classes, if the enrolment is over 25, the class is divided and one half comes on the first week of the course, and the other half on the second week.

Combination courses such as Gas Engine and Live Stock, or Dressmaking and Millinery, have not been found satisfactory, as the student usually has his mind on one subject and prefers to spend all his time on that subject.

It has not been possible during the past two years to make provision for nearly all the short courses and institute meetings asked for.

SHORT COURSES IN SASKATCHEWAN

BY K. W. GORDON, ASSISTANT, EXTENSION DEPARTMENT, UNIVERSITY OF SASKATCHEWAN

Short courses in rural districts are conducted by the Extension Department of the University of Saskatchewan. The Director of the department has an assistant and several extension lecturers. The latter are not all on the permanent staff. Farmers who have had an agricultural course or who have made a specialty along some definite line of agriculture are used and prove to be splendid men for this kind of work.

The women's work is carried on by a director who works in co-operation with the director of the extension department, and who has a number of trained instructors working with her.

The work in the country is conducted chiefly through the agricultural societies, which are distributed all over the province, and are assisted financially by the Department of Agriculture. Work is also done in co-operation with other rural organizations, such as the Grain Growers' Association, Homemakers' Clubs, Rural Associations, and Community Clubs.

A course is not put on in any locality unless a request is received from some representative organization. Forms are sent out early in the fall to the secretaries of all agricultural societies, showing what courses are available. This simplifies matters, as all the secretary needs to do, after consultation with the directors, is to mark with a cross the subjects that he thinks would meet the needs of the community. He also states an approximate date. Definite dates are set at the Extension Office, and circuits are arranged so as to save unnecessary travelling by the instructors. All details, such as advertising, and arranging for a hall, etc., are left for the secretary of the local society to arrange. Charts,

lantern slides, and moving pictures are used by the instructors.

Most of the agricultural and domestic courses last two or three days. Special two week courses in gas engineering can also be arranged in small towns where proper accommodation can be secured. For this course a nominal fee is charged, but all other courses are free.

EXTENSION SCHOOLS IN BRITISH COLUMBIA

BY F. M. CLEMENT, DEAN, COLLEGE OF
AGRICULTURE

The Extension Schools, as offered by the Faculty of Agriculture of the University of British Columbia, are usually of four days' duration. Invitations for schools are accepted in order of receipt and in no case does the college attempt to offer work that has not been requested by a local organization. It is usually

suggested that a local committee be formed, representing various associations and official bodies. This committee is made responsible for rent of hall, light, heat, advertising and such other matters as must be attended to locally. The committee is also responsible for a satisfactory attendance.

The programme is prepared at the college, but is ordinarily printed locally. While the subjects are of a general agricultural nature, local problems are dealt with to as great a degree as possible. For instance, in the small fruit sections, emphasis is laid on small fruits, and in the dairy sections emphasis is laid on dairying. The college assumes all responsibility for cash outlay, but the local committee is asked to assume the general responsibility for the success of the course.

Last year eight extension schools were offered, and the average attendance was sixty.

THE NATIONAL CONVENTION OF FEDERATED WOMEN'S INSTITUTES

BY ELIZABETH BAILEY PRICE

THE words "Edmonton in June" should have a significance to every Institute member in Canada, for at that time and place the second biennial convention of the Federated Women's Institutes of Canada will be held. To be exact, this important gathering—it is expected to be the largest of its kind ever assembled in Canada—will take place during the week of June 25-30, and will be followed by the Alberta convention of Women's Institutes and Girls' Clubs.

The convention committee announces that for the purposes of the convention they have secured the use of the Convocation hall of the University of Alberta, and that accommodation may be obtained at the university residences at

the rate of two dollars per day—this to include room and meals.

One of the features of the convention will be an exhibition of handicrafts. Already a great deal of attention has been directed to these by the Women's Institutes and, in British Columbia particularly, there has been a revival of spinning and weaving.

As the personnel of the national executive includes women of national and international importance, a very fine programme may be anticipated. All the vital problems will be discussed by exceptionally good speakers. Every Women's Institute member in Canada is invited to attend. Those who live in the East will be cordially welcomed to

the West. No feature of education and entertainment will be overlooked.

National Pins

The pins of the Federated Women's Institute are now ready and may be obtained from the provincial superintendents. Any member of any Women's Institute of Canada is entitled to wear one. These pins have as their design the Canadian coat of arms, and are most attractive.

Help for Soldier Settlers' Wives

All through the western provinces the Women's Institutes have been a very helpful factor in promoting the short course for the wives of the soldier settlers. This course of instruction which

is given under the auspices of the Home branch of the Soldier Settlement Board, is made possible by the co-operation received from the various universities, the schools and colleges of agriculture, and the departments of public health. The courses include demonstrations in butter-making, home nursing, poultry work, gardening, sewing, laundry work, bread-making, foods, canning, milk dishes, pastry, and community work for women. The Edmonton Women's Institute took charge of the billeting of four hundred women and children; the Peace River Women's Institute is arranging for the billeting of fifty, Red Deer took care of some ninety, while the Institute at Calgary is co-operating with other societies to help with a similar course to be held in that city in June.

AGRICULTURAL SHORT COURSES, 1921

COURSES AT THE NOVA SCOTIA AGRICULTURAL COLLEGE

THERE were ninety students in attendance at the Men's Short Course and twenty-eight in the Women's Short Course in the Nova Scotia Agricultural College, Truro, from January 4 to 14. The attendance was smaller than in former years, but the courses themselves were unusually good and were much appreciated by those who took advantage of them. The Women's Short Course in Home Economics and related subjects was the first of its kind held at the institute, and proved both interesting and profitable to those in attendance.

Agricultural Motion Pictures

One of the most effective as well as attractive features of this year's short course was the exhibition in the evenings of agricultural films taken in Nova

Scotia during last summer. In the preparation of these the college joined hands with the Dominion Atlantic Railway.

One of the films, on the grading of cream, under the title of "Mr. Sweet Cream and Mr. Lumpy Sour," attracted so much attention that the Government of Saskatchewan wired the Secretary for Agriculture asking permission to purchase a duplicate film.

Other films were on the grading and selling of wool co-operatively, poultry production, and the growing of O.P.V. (oats, peas, and vetches), and sunflower for silage purposes. The last mentioned shows the whole process from the ploughing of the land, through seeding, harvesting, and ensiling, until it is fed to the cattle. Two more films are now almost ready and will be shown at farmers' meetings during the winter. These are on cow testing and turnip growing.

Last year the department made use of films taken in other parts of the world,

and they were very good indeed. Yet all agree that local films, illustrating farming conditions in the province, are not only more interesting but also of greater educational value. The films taken by the college people, along with those taken by the Dominion Atlantic Railway, make up a fine movie library. They will be shown not only all over Nova Scotia this winter, but also in Great Britain, for the purpose of attracting immigration to this end of the Dominion.

COURSE IN HOME ECONOMICS

BY MISS HELEN MACDOUGALL, SUPERINTENDENT OF WOMEN'S INSTITUTES, TRURO, NOVA SCOTIA

A most successful short course in Home Economics was held at the Agricultural College, Truro, from January 5 to 14, 1921. The subjects offered were: Dairying, Gardening, Poultry-keeping, Home Nursing, Dressmaking, Basketry, Millinery, Foods and Cookery, Household Management, and Canning. The instructors in the various classes handled their subjects with skill, and the lectures throughout were helpful and practical. There was an enrolment of thirty-two students from various parts of the province.

The plan of serving dinner and supper at the college was most successful, as in addition to the added comfort and convenience, a spirit of friendliness and good fellowship was created, which added greatly to the pleasure of the course.

On the closing day the students had a display of their work, the exhibits including garments and millinery made in class; also examples of dainty basket-work. Work of this kind had not been included heretofore in the short courses, and all felt greatly pleased with the exceptionally high quality of the exhibits.

The entertainment given by the Women's Institute on the last night of the course was much appreciated by all the students. The course was a decided success from beginning to end, and all

who attended felt that they had benefited by the information and instruction they had received.

PRINCE EDWARD ISLAND SHORT COURSES

A general agricultural short course was held in connection with the new Technical and Agricultural School at Charlottetown from January 4 to 14. During the morning session, a course of instruction in field crops and the judging of grain was conducted by Mr. J. A. Clark, Superintendent of the Experimental Farm, assisted by Mr. Frank Tinney, Assistant Superintendent, Mr. S. J. Moore, Truro, N. S., and Mr. A. F. Hansuld of the Provincial Department. Lectures on various phases of Agriculture were given by Mr. James D. Thompson, Expert Wool Grader, Dominion Live Stock Branch; Mr. J. K. King, Representative of the Live Stock Branch, on co-operative shipping and selling of live stock; Mr. C. J. Cook, Kensington, on Dairy Record Centres; Mr. Cyrus Poirier, Representative Dominion Poultry Branch, Charlottetown, and others.

During the afternoon session, regular classes were conducted on the judging and care of live stock by Mr. W. J. Reid of the Provincial Department assisted by Mr. J. E. Rettie, Manager Guelph Winter Fair and Hon. Walter M. Lea, Commissioner of Agriculture. Classes on Motor Mechanics were conducted by Mr. Harry Whitlock assisted by Mr. Angus Lavie, both of the Technical and Agricultural School Staff. A number of classes were also conducted during the afternoon by Mr. Fraser T. Morrow, Provincial Dairy Instructor, on milk and cream testing.

A number of evening sessions were held at which lectures were given on various phases of live stock by one or more of the live stock men present; also on plant diseases by Mr. S. G. Peppin of the Pathological Laboratory, Charlottetown, on fertilizers by Mr. C. M. Williams of the Soldier Settlement Board, Charlottetown, on growing seed potatoes

by Mr. W. Boulter, Provincial Department of Agriculture, and farm management by the Hon. W. M. Lea.

There was an average attendance of forty-five students at all classes held, and the interest maintained throughout the

course was one of a very genuine nature. On the last evening a short programme of local talent was given by way of entertainment, after which refreshments were served.

LECTURE COURSES FOR SOLDIER SETTLERS' WIVES

BY MRS. J. MULDREW, DIRECTOR HOME BRANCH, THE SOLDIER SETTLEMENT BOARD,
OTTAWA

IN Ontario, three lecture courses have been held under the auspices of the Soldier Settlement Board for soldier settlers' wives—one at New Liskeard in Northern Ontario, one at Simcoe in Western Ontario, and a third at Ottawa.

In reference to the details for these I may say that we pay for the billets from the Training funds of the Soldier Settlement Board. The educational work is done partly by the members of our Home Branch, and partly by outside assistance. In Ottawa, for instance, the Federal Department of Agriculture took charge of two whole days, with lectures at the Experimental Farm, while the Technical School provided lectures in cooking, and the Victorian Order of Nurses undertook the lectures in nursing.

At Simcoe, Ontario, the Home Branch gave the lectures in cooking and canning. The extension department of the Ontario Women's Institutes supplied a lecturer in sewing, and we were able to take advantage of the annual short courses being held by the Women's Institutes at Simcoe and secure the advantage of lectures in poultry and gardening as well as the moving pictures from the Agricultural Representative.

At Ottawa, the local Red Cross contributed enough to cover the transportation of the women, and the Ottawa Electric Railway gave free transportation in the city. The assistance that has been so graciously and generously given to us has helped greatly in making the courses a success. Entertainment was provided for the women while in Ottawa

by Knox church, St. Paul's church, the Women's Canadian Club, Catholic Girls' Club, the Y.W.C.A., and by the Regent and Russell theatres. The Day Nursery took charge of all babies during the day, so that the women might attend the lectures.

The following were the topics of the lectures held at the Experimental Farm:—

Horticulture.—Potato growing; small fruits; vegetables in the home garden.

Dairying.—Demonstrations in the handling of milk in farm butter-making and in making soft cheese.

Poultry Keeping.—Poultry keeping in general; breeds of poultry; incubators; poultry feeds; turkeys, geese and ducks; selection of layers for egg-production.

Courses similar to those recently held in Ontario have been arranged in each of the other provinces. In British Columbia a six weeks' course with an enrolment of forty-five students is now being completed. This was held at the University of British Columbia, Vancouver, and is the second course of this duration held in that province. In addition to these, several three-day courses were carried on at different points earlier in the season.

For the province of Alberta five short courses of one week are planned. A very successful one at Edmonton has just been completed. One is now in progress at Red Deer, and others will be held at Grande Prairie, Calgary, Lethbridge and Peace River. Saskatchewan will have a course at each of the following

centres: Regina, Prince Albert, Saskatoon, North Battleford, Wadena, Moose Jaw, Kerrobert. The first course under the auspices of the Home Branch was held in this province last winter, and the success of this form of education demonstrated. In Manitoba, a course is now being held at Dauphin, and complete arrangements have been made for others at Portage la Prairie, Brandon, and at Winnipeg, where an attendance of 350 students is expected. Quebec has had a most successful course at Sherbrooke; and Truro, in Nova Scotia, was the centre of a recent and well-attended course. A six weeks' course was held in Charlottetown last spring at which students from various parts of Prince Edward Island were present. New Brunswick will have several three-day courses in the near future; at these a large attendance is expected.

In each and every centre a great deal of the success in making arrangements, and much of the enthusiasm of the courses has been due to the co-operation and loyal support of organizations which have for their aim the welfare of the returned man and his family.

Transportation for all students was provided by the Red Cross in Nova Scotia, Quebec, Ottawa, Manitoba and Saskatchewan. In Sherbrooke the Red Cross offered their rooms free of charge for a medical and dental clinic the cost of which was defrayed by the Canadian Patriotic Fund, and in other centres the Red Cross arranged for a V.O.N. nurse to be in attendance to give lectures. Provincial departments assisted in supplying instruction and local voluntary organizations arranged entertainments and in every way have helped to make the courses a success.

AGRICULTURAL INSTRUCTION IN PRINCE EDWARD ISLAND

Drainage, Soils, and Crops

The work undertaken in the production of Clover Seed, and for which two Clover Hullers were purchased, has been followed with one demonstration for each machine to prove the efficiency of the machine for the work. The large machine, a No. 2 Birdsell, is giving excellent satisfaction and a programme of work is being arranged for it during the early months of 1921, the idea being to place it in convenient centres where clover has been grown and within reach of a justifiable quantity of the crop.

The drainage operations, although being hindered from making a complete season's work on account of shortage of drain tile, proved to be more satisfactory from a financial point of view than any previous season. It is hoped that with the opening of the next season the department will be in a position to carry on the work without a hindrance of any kind. This will perhaps mean the

operation of the brick and tile plant for at least a time, but it is believed that this can be done with satisfaction to all concerned. The demand for tile draining is not only growing in this Province, but is receiving a more serious consideration in Nova Scotia and especially in New Brunswick, and at present the only plant manufacturing drain tile is the one located in this Province.

Limestone pulverizing operations were conducted as long as possible, but had to be concluded shortly before Christmas on account of the snow making the pulverizing impossible. The undertaking in itself has already justified its inception, and the demand for Limestone has grown to such an extent that the department is considering importing a number of carloads from St. John, N.B. The railway has been solicited to assist in this latter undertaking, and have granted a considerable lowering of the freight tariff for car shipments. They have also granted a tariff on a mileage basis for

shipments from the provincial plant at Bloomfield.

Live Stock and Dairying

A full report of the Dairy Competition is still pending, and will be noted in the next quarterly report.

During the fall months a considerable amount of time was spent purchasing and distributing pure-bred rams, as well as other animals to live stock breeders. The field for such work is being enlarged and made more justifiable by the efforts of the Live Stock Branch in promoting co-operative live stock shipping. The time of the Dairy Instructor has been employed visiting the cheese and butter factories and attending a number of the annual meetings in preparation for the opening of next season's work.

Co-operative Marketing

During the fall months the Potato Growers' Association shipped ten carloads and filled a number of smaller orders for No. 1 Seed Potatoes, the market being chiefly in Long Island and New York State, as well as many points in the Maritime Provinces.

Women's Institutes

The Staff in this department has been reduced by the resignation of the Supervisor, Miss Della E. Saunders, to accept

a position as Demonstrator for MacDonald College, Quebec. The remaining two members have been occupied with attending annual institute meetings and preparing for Short Course work.

Elementary Agricultural Education

The work of the Rural Science Department at the Prince of Wales College has been arranged to occupy half of the time of the instructor engaged for that purpose, the other half being used to conduct classes in farm crops at the Technical and Agricultural School. The greater part of the time of the Agricultural staff has been occupied with teaching at the Technical and Agricultural School, which opened on November 15 with a total enrolment of ninety-nine students. A regular course in practical Agriculture, for which there was an enrolment of twenty-eight students, forms the principal course of instruction. A general agricultural short course and a course for instruction in Cheese and Butter making, are also contemplated. The school has already justified itself in every department, and it is to be hoped that, as the work develops, each department will be more fully equipped and the institution in general placed on a really permanent basis.



PART III

School Agriculture and Related Activities

THE DEVELOPMENT OF AGRICULTURAL EDUCATION IN SECONDARY SCHOOLS

DEPARTMENTS OF AGRICULTURE IN ONTARIO HIGH SCHOOLS

BY DR. J. B. DANDENO, INSPECTOR, ELEMENTARY AGRICULTURAL CLASSES

THE scheme adopted by the Department of Education of Ontario in 1915, was prepared with a view towards providing a kind of education which would likely meet the needs of country people especially. It has been recognized for many years that the scholastic type of education instituted in the secondary schools of the province, though, in many ways the best so far made use of in any of the countries of the world, did not quite fulfil the requirements of those destined to live in the country, either as farmers or semi-farmers. The courses proposed under this scheme were new to the Province of Ontario, and, because of this fact, the people did not realize—nor do they yet realize—the usefulness or practicability of a course of study of this character. Too great an importance has always been attached by the farming communities especially to the preparation of candidates for college matriculation and for teachers' certificates.

Both these obstacles can be overcome only by the education of the public as to the character and value of these courses. And this is naturally a slow process. All educational movements of any real and permanent value are necessarily slow; therefore there is no need for discouragement even if the scheme does not produce spectacular results at the outstart.

The arrangement under which the scheme is to be worked out is given in a pamphlet issued by the Department of Education in 1915, "Recommendations and Regulations for the Establishment, Organization and Management of Agricultural and Household Science Departments in Continuation and High Schools and Collegiate Institutes."

The following quotation from this pamphlet conveys the main idea: "The Agricultural courses, however, established under the *Industrial Education Act*, are managed by Advisory Agricultural Committees and include courses in English, History, Mathematics, Science and Art, suitable for a farming community as well as courses in agriculture and household science. At present not more than these departments can be looked for; but, when the public interests necessitates Agricultural High Schools, they will be duly established and liberally aided by the Government. It must also be borne in mind that the organization of the agricultural and household science departments provided herein is necessarily experimental; after a couple of years such modifications will be made as experience will then justify."

So far, in Ontario only five schools have established departments of agriculture, and experience is now showing that, unless considerable modifications are made in the regular course of study

in High Schools especially—such courses as lead to Matriculation and to the Normal Schools—progress will not be rapid. The few schools referred to above are carrying on, under difficulties, by sheer enthusiasm, industry and zeal on the part of the respective teachers. However, we have gone far enough to show that we are heading in the right direction and that to ensure success we have but to persevere intelligently and patiently.

The chief differences between this scheme and that outlined for High Schools which carry on classes in Agriculture are about as follows:—

Time limitations for special subjects:—

Departments.—For Agriculture (special subjects) two afternoons for the first year and three for the second year;

For Farm Mechanics, one afternoon for each year. No work provided for Middle School.

Classes.—For Agriculture two hours a week for each year of the two years. A two years' course in addition is provided in the Middle School,—three hours per week.

In case of both schemes,—Classes and Departments—the subject is not recognized by any institution as a part of the course leading to admission to that institution. In the case of classes, the subject is a bonus merely.

Of the two plans, the scheme of grants is more liberal to Boards in the case of Departments, but more liberal to teachers in the case of classes. For details with regard to the apportionment of grants, recourse should be had to the Regulations governing the apportionment.

At present there are five schools maintaining Departments and thirty maintaining classes. Of the latter, six schools have classes in the Middle School in addition to those in the Lower School.

THE PORT PERRY HIGH SCHOOL AGRICULTURAL DEPARTMENT

BY THOMAS H. FOLLIICK, M.A., PRINCIPAL

Port Perry is located in the centre of an excellent agricultural district, the townships of Reach, Scugog, and Cartwright, with the southern part of Brock and the northern part of Whitby, making up the area—outside the village of Port Perry—from which our high school attendance is drawn. General mixed farming is conducted throughout the townships, and in several localities stock farming (chiefly purebred cattle) is a very important industry. About two-thirds of the attendance in the school is from the townships, and this fact, coupled with the great inducements held out by the Department of Education, led to the establishment of a department of agriculture in this high school in the fall of 1918.

The Board of Education entered upon the plan with enthusiasm; the village people viewed it favourably, but awaited developments before committing themselves to any stated opinion, and the country people were either indifferent or cautiously favourable. One objection from the parents of the country students which we had to meet was that their boys already knew all about farming, and did not need to take up that kind of work in school. It was not always easy to convince them of the fact that the boy who does the best work at home will obtain most out of the course at school; that farming is already a science to be studied in all its bearings, and that habits of accuracy and thoroughness are formed in the field, the garden, and the farm workshop as much as in the physical or chemical laboratory.

For years past, many farmers have desired to give their children more than a public school education, although they did not wish them to become teachers or to take a university course. The young people would come to high school for a

year, obtain a limited amount of Latin, French, algebra, and art, in addition to the continuation of their public school subjects, and then leave school with nothing to show for their work. Such students we now advise to take the agricultural course: the result being that they remain for two years and use agriculture as a bonus subject on the Lower School examination, or as the equivalent of the first year's work at the Ontario Agricultural College at Guelph. Our time-table also enables those who wish to become teachers to take up all the necessary subjects in addition to agriculture, and so enable themselves to teach agriculture after one summer session at Guelph. As the public are beginning to realize the benefits of such a course, they are giving the work of our department increased support, and those taking the course are growing in numbers and in enthusiasm.

THE AGRICULTURAL DEPARTMENT OF THE HIGH SCHOOL AT OAKVILLE, ONTARIO

BY W. B. WYNTHAM, PRINCIPAL

The Agricultural Department of Oakville High School has been in operation for about three years and a half, and while we have not accomplished all that we had planned to do, still we feel that the department has justified its being by the benefit that it has been to the pupils and to the community.

For the first two years we carried out the complete course including Farm Mechanics, but since then we have had to drop the latter owing to increased attendance and lack of assistance. The number of boys taking the regular department course was smaller than expected because of the scarcity of farm help. The number varied from five to twelve, and those who took the work not only enjoyed it but were greatly benefited. Some of these students showed

great interest in the work and have continued it since leaving school by taking up the experiments given out by the Ontario Experimental Union. We now ask all pupils taking agriculture to take as much of the work as possible under the department, as it gives them a wider scope than the ordinary agricultural classes as formerly conducted. We hope soon to revive the work in farm mechanics.

The work of the past year (1920) may be divided under the following heads: Class Work, Home and School Experiments including Home Projects, and School Plots. In the class work we aim to cover the course laid down in the regulations for the departmental examinations with as large a share of experimental work in the laboratory as time will permit.

The home experiments consisted in propagating and growing plants, seed selection, germination and seed tests, testing the dairy cow or herd, and making a plan of the farm for crop rotation. The home projects consisted in growing one vegetable and one flower, with plan of work, notes on care and progress, and results. Some also planned and cared for a whole vegetable garden. For these projects, seeds, fertilizers, and instructions were supplied.

Twenty-eight took up and carried out this work, with splendid results in most cases. The school plots during the first three years were experimental, as well as an effort at production, and were carried out on about three acres of land. We grew beans and potatoes the first year, and with the latter carried out experiments with various kinds of fertilizers. The second year we grew potatoes mainly, and had a few experiments in the production of vegetable seeds. The third year we grew sweet corn. The proceeds from these plots were fairly large, and were devoted to Red Cross and other patriotic work.

During the past year we conducted, mainly, an experimental school garden in which we worked out a variety of experiments in growing vegetables. These were about as follows:—

Corn.—Thinning to three plants to a hill vs. unthinned; cultivated vs. uncultivated (except weeds cut out).

Beans.—In hills, 4-5 seeds to hill, 1 foot apart; in rows, 1 seed every 4 inches.

Tomatoes.—Stake-trained and pruned vs. unstaked and unpruned.

Onions.—From Dutch sets with and without line; from seeds set with and without line; from plants started in hot bed.

Potatoes.—Seed treated with formalin vs. untreated; cut vs. uncut; large vs. small seed; hilled vs. unhilled; deep vs. shallow planting; with and without special fertilizer.

Other vegetables.—Lettuce, radishes, etc., with and without nitrate of soda.

Two pupils shared in carrying out each experiment, and while the dry weather in the early summer interfered with some of these and necessitated replanting or replacing with later season crops, every one profited by the valuable experience gained and the lessons learned.

An opportunity was given to agricultural pupils to profit by lectures and demonstrations in the community. The gardeners' and florists' associations hold their meetings in the assembly hall of the school, and have illustrated lectures once a month, which our pupils attend. Pupils also have taken part in short courses in stock judging. Hot lunches have been introduced for pupils from the country, and pupils have been assisted in every possible way to make the work of the department profitable.

AGRICULTURAL DEPARTMENT AT THE DRAYTON CONTINUATION SCHOOL

BY G. A. CLARK, PRINCIPAL

Drayton is a village of about 600 population, situated in the centre of a rich agricultural district in Wellington county. It would be difficult to say what class of farming predominates. Dairy products, beef cattle, hogs, eggs, poultry, and honey are the chief products marketed. Large quantities of fibre flax are produced to supply the flax mills at Drayton, Alma, and Arthur. It is not especially noted for fruit production, though, as a rule, there are enough apples for home use.

The people of the community have always been sympathetic toward our school. We began our agricultural classes in 1914, changed to a department of agriculture in 1917, and have no thought of changing back.

We have three teachers spending practically all of their time at high school work. The school is wired and we have hydro-power. We have a good lantern and a moving picture machine. We have access to the films of the Department of Agriculture, Toronto. We have a good reference library in agriculture. Have milk-testing outfits, incubator and other equipment. We have three-fifths of an acre of school garden. This we divide into about fifty plots, each having an area of one square rod. These are given to the students. The student who won first prize last year had to come about five miles. We conduct experiments on spraying, treating potatoes for scab, etc.; also conduct classes in the pruning and grafting of fruit trees. I think nearly every student can test milk for fat. Our work is as practical as we can make it.

In order that students may enter our classes, they must have passed the high school entrance examination, or have

reached at least the fourth grade in public school, and be not less than fifteen years of age. Many of the boys of our classes attend only for one or two years and then go back to farms. Many of the girls train for teachers and go back to take charge of country schools. About 75 per cent of our students are from farm homes.

So far as extension work is concerned, we have a moving picture show one night a week during the winter to give the public an opportunity to see the films of the Department of Agriculture, Toronto. We also have a small spraying outfit for spraying potatoes, which we loan or give demonstrations with in the country. We are trying to make our school the centre for a school fair district. We have supplied the public schools of the locality with seeds and eggs, and they have been taking part in our fair.

AGRICULTURAL DEPARTMENT OF THE HIGH SCHOOL AT BEAMSVILLE, ONTARIO

BY J. G. ADAMS, M.A., PRINCIPAL

The Beamsville High School is situated in the centre of the Niagara fruit belt. It is twenty miles from Hamilton on the West, and twelve and twenty-five miles from St. Catharines and Niagara Falls respectively on the East. It is two miles from lake Ontario, and the southern boundary of the belt is about the same distance away. Beyond the latter, the farming operations are of the mixed type.

The agricultural department of the school was instituted in an attempt to respond to the apparent need for a type of school that would educate the young people farmward rather than cityward. At the time of its inception, the attitude of the people to this particular course was chiefly one of indifference. This may be accounted for largely by the lack of advertising of this new feature.

The course includes instruction in most of the subjects of the first two years of the high school course, Latin and French excluded. In their stead agricultural subjects, including farm mechanics, are taken. The cost of the special equipment necessary and of the special teacher is covered by very substantial government grants. The equipment includes incubators, Babcock testing machines, garden tools, a lantern suitable for slide and projection work, and the common wood-working tools. To this is being added a moving picture outfit.

As a companion course to the agricultural course, a household science course is offered to fit girls for home life. A specialist in the work teaches in a specially fitted room. The equipment includes electrical heating appliances range and hot-plates, and suitable cooking utensils for each pair of girls.

The practical work in these courses is supplemented, during the summer, by work in the school garden for the boys, and by special problems as home projects for both boys and girls. These projects are planned and discussed at school, and supervised by the teacher during the summer vacation.

The requirement for admission to the courses is fourth form, public school standing; high school entrance is not necessary. This is planned to appeal to those rural pupils who have had no intention of going farther than the public school—perhaps because our high schools heretofore offered no courses particularly adapted to their future needs. The agricultural subjects are taught to all pupils of the first two years, only less time is given to the work.

The courses are now being offered for the second year. The first year the response was not encouraging because of lack of advertising. This year the number of students has doubled. Most of the boys are looking forward to courses at the Ontario Agricultural College. Some of the girls look forward to nursing;

others expect to attend Macdonald Institute and return to the home. But the great class of pupils we wish to touch has not responded. We hope to attract those who would otherwise stop attending school after passing the entrance examination, persuading them to come and take two years with us before settling down to farm and home work. To this end, we are undertaking special extension work this winter in the form of a series of lectures. These are to be on agricultural topics, and will be given by professional and practical men. They will be delivered in the school auditorium, and we expect to use this as a means of advertising our special courses.

We have faith in the value of the courses for those for whom they were designed. We have equal faith in the future of the work, and believe that a hearty response will be shown as soon as people are thoroughly cognizant of its value.

AGRICULTURE IN THE HIGH SCHOOLS OF BRITISH COLUMBIA

BY J. W. GIBSON, DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

AT the present time agriculture is taught in ten high schools in the province. The course, which covers two years' work, begins with the second year in high school, and is usually preceded by a course in general science which affords a very suitable introduction to agriculture. Girls as well as boys take the high school work in agriculture. The subject is optional with the other sciences, and equal with them as matriculation subjects. Students taking three science subjects, one of which may be agriculture, are required to take only one foreign language for junior matriculation. The same standing admits to Normal school. Those students who complete the Normal school course who have taken the agricultural option in high school are

granted a special rural science diploma—the equivalent to the diploma issued by the department to teachers devoting their full time to rural science for at least two summer sessions. As in most of the provinces, this diploma entitles teachers to a special bonus in recognition of work accomplished in the teaching of elementary agriculture. We already have a few of these young men and women teaching in our public schools, and there is every reason to believe that they will do more efficient work along agricultural lines than will most of the teachers who have not had this special preparation.

In every case instruction in agriculture in high schools is in charge of agricultural graduates who have also had teaching experience. The direct method of instruction through laboratory, garden and farm excursion is followed, the agricultural text-book idea being practically eliminated. In some cases special garden houses in addition to the regular agricultural laboratory-class room have been provided and in one case a greenhouse has been provided.

The high school agricultural course is growing in popularity amongst the girls as well as the boys. It is of recognized advantage practically as well as educationally. It seems to meet to a degree the needs of those communities and those high schools where it has been in operation. It appeals to boys and girls who have some first-hand knowledge of rural things, and also to those on the other hand who wish they had. It appeals to boys, particularly, who look forward to advanced studies in agriculture in the university and as an evidence of their interest in the subject as well as of the thoroughness of the instruction given in it, all of the students who wrote on the matriculation examinations last June were successful and many of them made very excellent records. We hope to include a few additional high schools in our agricultural programme during the present year.

THE AGRICULTURAL COURSE AT CLOVERDALE, B.C.

BY R. H. L. GIRLING, PRINCIPAL

Surrey High School is situated in the village of Cloverdale, and is the centre of a prosperous farming community in the lower Fraser valley. Dairying on the large holdings, and poultry keeping, with small fruits, on small acreages, are the branches of farming most highly developed.

Naturally our high school is patronized by students from farm homes or rural villages, and it is felt that such a school should serve the community by giving instruction in the science of agriculture. A number of farm boys attend high school a year or so before returning to the soil; while many other students hope to become teachers and instruct farm boys and girls. Both these classes find the course in agriculture particularly useful.

The course was introduced in 1916 through the co-operative efforts of local institutions such as the farmers' and women's institutes and the rural science branch of the Department of Education. The Department of Education pays the salary of the instructor, while the school board is held responsible for scientific equipment, office expenses and transportation.

E. L. Small, B.S.A., a graduate of the Ontario Agricultural College, with teaching experience, has had charge of the work since its inception. His duties not only include instruction in high school agriculture, but the supervision of nature study, elementary agricultural teaching, and school and home garden work in all the public schools in the municipality.

As a high school subject, agriculture is a two-year course, starting with the second year in high school. It is one of the three optional science subjects necessary for matriculation standing. At least three hours per week is devoted to the subject. A large percentage of the students attending the Surrey High

School enroll in the course. This I consider shows a sympathetic feeling for the work on the part of the ratepayer.

An agricultural class-room was equipped with tables, sinks, cupboards, etc., and electric fixtures were installed for night classes. Soil tubes, milk tester, fanning-mill, drainage level, microscope, pruning tools, and tools necessary for experimental gardening were secured. No text is used by the students, and all work is as practical as possible. Fifty per cent of the final examinations is allowed for practical work. Owing to the extremely heavy clay, the experimental school plots have not been developed as had been expected, and for this reason more stress has been placed upon home project and garden work. During the spring term, the best poultry, dairy and general farms are visited by the class for a first-hand study.

AGRICULTURE IN THE VERNON SCHOOLS

BY V. BYRON ROBINSON, B.S.A., DISTRICT
SUPERVISOR OF AGRICULTURAL INSTRUCTION

The building used as a high school in Vernon is so over-crowded that no room was available for an agricultural class room; hence a room was secured in the court house. This is a large modern building affording excellent class room facilities. The high school is situated but a few hundred yards from the court house so that the pupils are put to very little inconvenience in going from the one building to the other.

The agricultural lands of the Vernon district are for the most part devoted to orchards, and fruit growing is the important industry of the locality. Dairying and vegetable growing are carried on to a limited degree, but are bound to become of more importance in the near future.

Origin of the Work

Considerable propaganda was necessary before the people of Vernon wished to undertake agricultural instruction

through their schools. The Director of Elementary Agricultural Education for the province made several trips to Vernon for the purpose of interesting the school board and the ratepayers in the movement. His first visits were made about 1912, and it was not until 1917 that an instructor was sent to Vernon. The instructional work of the local horticultural branch of the Department of Agriculture did much towards showing that agricultural instruction could be made practical. Credit is also due the various local agricultural societies for the stand they took in the matter.

Staff, Equipment, and Course of Study

The agricultural work is taught by an employee of the Department of Education for the province. This instructor is loaned to the city, which is required to meet his travelling expenses and to equip and maintain a suitable class-room and laboratory. This includes not only laboratory and class-room materials but the necessary tools for conducting the two school gardens of the city.

The course of study followed is that outlined by the Department of Education for use in the schools of British Columbia.

Methods of Instruction

This course is so constituted that it permits of a division of the required work into monthly allotments. At this school one topic per month is dealt with and at the end of that period an examination paper is set on the subject. Two three-quarter hour periods two days per week are devoted to agricultural work. The time is divided in two portions, one being used for lecture work and the other for a laboratory period. An occasional laboratory period is utilized for trips to local points of interest such as fruit ranches, the packing houses, dairy farms and the creameries. Each student provides himself with a duplicating note book. All laboratory exercises are entered in this, one copy being retained by the student and one being

passed in to the instructor. Credit is given for this work.

Each student of the agricultural class is required to carry on a project as supplementary to the class room work. One may choose a project in which he is directly interested and from which he hopes to derive a cash benefit. This project involves practical work which is carried on over a period corresponding to one growing season. In addition to the practical work of the project each student is supposed to complete a certain amount of study directly bearing on the project. Provincial bulletins, Dominion bulletins, and American bulletins are used as texts for this work. It is hoped that arrangements can be made with such institutions as the University of California and the Kansas Agricultural College, whereby students may enroll with one of these institutions for a correspondence course dealing with their project. The outline given below of a project designed for a student interested in raising Black Siberian Rabbits will serve as a concrete example of the project work.

No requirements are set for entrance to the first year agricultural class. Students who take agriculture have to take but one language during their second year high school work. Admission to the second year agricultural class is gained by the successful completion of the first year's work.

At present there are twelve members in the first year agricultural class, this being about fifty per cent of the enrolment for the second year high school work. Next year, when both first and second year agricultural classes will be in operation, there will be an attendance of about thirty.

The majority of the students are from the fruit ranches surrounding the city and will in the course of time assume an active control in the management of their home ranch. Three of the members plan on pursuing their work through an university course and later entering the field of technical agriculture.

Local Extension Work

Arrangements have been made between the Department of Education and the Department of Agriculture whereby the District Supervisor devotes one half of his time to Department of Agriculture duties, acting as the Agricultural Representative for the district.

In addition to this work, considerable time is devoted to aiding the rural teachers of the district with their nature study and agricultural teaching. A circulating library of texts and bulletins dealing with nature study and agriculture has been formed and has proven its worth as an aid to rural teachers. Printed lesson forms and nature study projects are prepared every so often and sent to the rural schools of the surrounding country. A special lecture course for teachers of the city schools interested in nature study, was presented the first half of this term. The local department of agriculture officials co-operated to make this course a success. The lectures are being continued this present term.

PROJECT IN RABBIT REARING

Outline of the work by months:—

March.—Construction of hutches. Purchasing of stock. Study of Breeds and Hutches, based on various bulletins. An essay on the above.

April.—Experiments in the cost of feeding started. Study of feeding methods as described in the bulletins. A written essay based on the study for the month.

May.—Feeding experiments continued. An experiment in cross-breeding started. A study of the care of the breeding doe, as outlined in the reference bulletins. An essay based on the study for the month.

June.—Feeding and breeding experiments continued. A study of the care of the young as outlined in the reference bulletins for the course. An essay based on the study for the month.

July.—Feeding and Breeding experiments continued. Preparation of stock for market. A study of the preparation of stock for market as outlined in the reference bulletins. An essay based on the above study.

August.—Feeding and Breeding experiments continued. Preparation of stock for exhibition. A study of the preparation of stock for exhibition as outlined in the reference bulletins. An essay dealing with the study for the month. An essay giving the results of the feeding experiment. An essay giving the results of the breeding experiment.

HIGH SCHOOL AGRICULTURE AT ENDERBY, B.C.

BY J. B. MUNRO, B.S.A., DISTRICT SUPERVISOR OF AGRICULTURAL INSTRUCTION

The course in Agriculture and General Science in the Enderby High School is conducted in accordance with the regulations of the Department of Education. The present system has been in operation since 1916, when a district supervisor of agricultural instruction was appointed to supervise the teaching of agriculture in the schools of Armstrong and Enderby.

Enderby is the commercial centre of a mixed farming district in the northern part of the Okanagan valley; consequently the practical teaching deals with general farm practice, and local problems are given prime consideration.

There are twenty-seven pupils enrolled in the courses, some of whom are taking agriculture as a subject preparatory to an agricultural course at the University of British Columbia. Others, whose objective is a teacher's certificate, realize that a knowledge of agricultural science is a necessary part of a successful teacher's equipment, and for that reason choose this option. The majority of our students, however, are taking agriculture because they are the sons or daughters of farmers, and after a few terms at

the high school they must return to the farm.

For the benefit of the latter class, the work outlined in our syllabus is so taken up that it will give the greatest assistance in the solving of practical farm problems. At the same time those striving for matriculation standing are not neglected. The present arrangement, whereby General Science is taken in the first year of high school, makes it possible to give the boy whose schooling must shortly terminate a valuable insight into the principles underlying proper agricultural methods. The general science course is broad, giving plenty of latitude to the instructor who arranges the work to suit the requirements of the class.

The garden in connection with the Enderby school has an area of one acre. Part of this has been utilized as a miniature experimental farm. Variety tests and tests with fertilizers have been conducted, and the results were given to the public through the local press. The main project work carried on has been with poultry, very successful results being secured. At present arrangements are under way for the holding of a fall school fair at which the products of home and school gardens will be shown.

AGRICULTURAL INSTRUCTION IN THE HIGH SCHOOL AT ARMSTRONG, B.C.

BY L. C. STUDDERT KENNEDY, PRINCIPAL

SITUATED as Armstrong is in the midst of an excellent agricultural district at the northern end of the famous Okanagan Valley, the trustees of the school saw very clearly that the curriculum of the high school would be very greatly improved and a need of the district would be met by the establishment of a course in the Science of Agriculture.

With this in view an agricultural building has been erected on the school

grounds; ample provision has been made for school gardens and for the practical demonstration of the known facts of the science of agriculture, in relation to soil values and the treatment of soils; the large and well-equipped laboratory of the school has been placed at the disposal of the Supervisor of Agricultural Instruction for the district and every facility is being given to what is now regarded as a very excellent and essential addition to the curriculum of this high school.

The agricultural course is wide and liberal, and many pupils are found to be taking a very real interest in the agricultural work, who find it hard to manifest much interest in many branches of the ordinary subjects of their school work. Their work in agriculture seems to arrest their attention, it seems to appeal to a something within them which arouses their interest, and this interest is being very clearly manifested by the number of pupils producing really good work in the subject.

In this connection I should like to mention, in particular, the work that is being done in Entomology. This work has, for quite a number of young people, a very real interest, and both in this province and in the province of Manitoba I have seen really good results coming from the study of this subject.

Their studies in agriculture enable the pupils to see more clearly the many excellent features of the animal kingdom and, as a result of this knowledge, they obtain a much greater appreciation of the work for good that is being done all the time by animals, both great and small. As a result of this knowledge, a seemingly natural tendency to the wanton destruction of and cruelty to small animal life can be practically eradicated from the daily conduct of many boys. This is accomplishment and is, therefore, one of the greatest recommendations for the value of the subject.

The investigations conducted relative to the proper treatment of soils should be of value in that there is a great

variety of soils in this district, and a better understanding of the least costly and at the same time demonstrably scientific method of treating soils, should, in time, aid production.

There was, this year, a much greater interest shown by the pupils of the high school in the judging of cattle at our local fair, and we can see how, in time, this agricultural course will arouse a clearer understanding and appreciation of the main work of the district, viz., agricultural production—which is the most essential and vital work of the province and of the entire Dominion.

The agricultural course, as forming part of the school curriculum, is still in its infancy, and is, possibly, more than

any other subject, in the experimental stage; but for the few years that it has formed part of the High School course, it has given clear proof of its educational value.

It is a course which certainly has an interest for a number of pupils—it affords them a number of excellent educational experiences that they could not otherwise obtain; it aids in the formation of a sounder attitude of mind toward the actual and essential work of the district in which they live, and at the same time it gives a considerable amount of useful, practical information, which could not be secured by these young people from the study of any other subject in the school curriculum.

AGRICULTURAL TEACHING IN THE PUBLIC SCHOOLS

Systems of Instruction Outlined. The Problem of Successful Application not yet Solved. Some views on Standardization

AGRICULTURE IN THE SCHOOLS OF NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR OF RURAL SCIENCE

NOVA Scotia has no definite or compulsory course in Agriculture in the common schools. High School Agriculture is prescribed as an optional in the first year. Even here, it is a book subject rather than a practical one.

Through all our common school grades a certain amount of agriculture is prescribed under the heading "Nature Study." Our teachers, however, are slaves to the text-book habit; and, consequently, do very little effective work in any branch of nature study. If a definite course were prescribed, a text would doubtless be prescribed to accompany it. That would render the whole course useless; for the teacher in nearly every case would assign book lessons and "hear" them.

Though "Nature" lessons are prescribed, we have no method to enforce

their being taught. As a matter of fact, they are not taught. Nor will they be taught until we have more efficient training for teachers and some means whereby we may follow up their teaching and compel them to give practical instruction. Unless we have district supervisors—say one for every thirty or forty schools—our work will continue to be inefficient.

The only way to enforce an *attempt* at agricultural teaching will be to place it on the list of examination subjects. That, however, will not insure real teaching. It will simply supply the agricultural language of the text-book. Until children are graded by specially trained supervising teachers on the work actually done and by oral instead of written examinations, our work will not be very valuable or progressive.

To standardize our course is not a solution of the difficulty. Our schools are standardized to death now. Standardization is excellent for a machine but not for a human being. Individuality must be encouraged in any effective school system.

SCHOOL AGRICULTURE IN SASKATCHEWAN

BY FRED W. BATES, B.A., M.SC., DIRECTOR

The problem of elementary agricultural education still awaits complete solution. After many years of trial and experiment and much failure the place of Agriculture as a subject of study in the elementary school is firmly established, but the problem remains to simplify the work so that the average teacher may handle it satisfactorily and efficiently.

Perhaps the most important step in that solution will be the development of a sane and satisfactory course or outline. If all teachers used the nature study method and utilized to the full the environment of the pupils, such a course might not be necessary but under present conditions some guide must be provided. It must be remembered, however, that the most perfect outline of study will not protect the pupil from inefficient teaching.

In formulating the course, the real aim or object in providing instruction in Agriculture must always be kept in mind. The natural development of the child from a lusty young animal into a highly socialized thinking human—not the cramming of young minds with masses of undigested information—must be the ideal, no matter what the subject of study. Agriculture is taught, therefore, because it is a basic industry in civilization, and a proper understanding of our present day social relationships and responsibilities can never be gained without some knowledge of this great factor in human development. Agriculture is world wide, it is older than our

civilization and in some, if not in many of its phases, touches every human life intimately.

The great weakness in agricultural instruction lies not so much in the course as in the teaching of it. The older subjects have been so thoroughly systematized that there is little need for selection: the work being quite clearly defined. In Agriculture the field is so broad, there is so much available material and there are so many avenues of approach, that many teachers, feeling their inability to select and arrange, seize the first book that may come to hand and proceed to lecture and give notes, while others, failing to understand the real aim and purpose of the work, make little or no attempt to carry out the suggestions in the course.

In Saskatchewan, Agriculture has been a subject of study since territorial days. A few years ago a complete revision of the course was made in order to make it more practical and more easily directed. It was felt that the proper method of approach was through Nature Study, hence a Nature Study course was outlined for Grades I to VI. Beginning with simple observations of familiar natural phenomena the pupil is gradually led to a direct study of every phase of his environment. His natural instincts to collect, to roam, to dig in the ground are utilized through excursions, "hikes," making collections, and garden operations. At all stages his interest in other parts of the world is aroused by story and reading so that he comes to know the world as a great hive of human activity, working and delving that there may be a sufficiency of food, shelter and clothing.

In Grades VII and VIII, Agriculture, as a formal subject, is introduced. The mass of information gained during the previous years passes under review and is organized. General principles are discovered, abstract notions developed,

theories formulated and new lines of endeavour undertaken in order to determine whether the experiences of the past have been correctly interpreted or not.

For convenience the course is divided into sections as follows:—

Plant Life.—Parts of Plants, Food, Seed, Germination and Classes.

Weeds.—Noxious Weeds Act, Recognition, Methods of eradication.

Crop Production.—Farm and Garden Crops, Seeding, Cultivation, Harvesting, Rotation.

The Soil.—Formation, Character and Types, Preparation for Crops, Conservation of Moisture and Fertility.

Farm Implements.—Farm operations, Labour, Mixed farming, Record keeping, Marketing, Storage, Home planning.

It will be readily seen that this course cannot be treated exhaustively. The aim is to provide a guide in organizing the first-hand information already gained by the pupil and to correct those points where through faulty observation or careless thinking, inaccurate ideas have been formed. It is believed that when properly conducted this course will bring the child to a sympathetic and intelligent understanding of the greatest of all industries—Agriculture.

While there has been marked improvement in the treatment of this subject in the schools, the situation is far from satisfactory. The difficulties and weaknesses, already noted, are all too prevalent in Saskatchewan. To assist the teachers in the field, lectures and discussions are held at conventions and institutes, special courses in Agriculture are conducted at the Summer School for Teachers and general aid given through correspondence and personal direction. Special instruction is provided for the teachers in training at the Normal Schools, but as the time allotted is not sufficient in which to cover the whole

field, effort is concentrated on methods and in developing a sympathetic attitude to the work.

Up to the present no text book in Agriculture has been provided. It was thought better not to have the work attempted at all, than to have a mass of predigested material imposed on the children. The time is rapidly approaching, however, when some form of laboratory outline must be developed as a guide to teachers in planning their work.

THE BRITISH COLUMBIA SYSTEM

BY J. W. GIBSON, DIRECTOR, ELEMENTARY
AGRICULTURAL EDUCATION

For years the course in nature study and elementary agriculture in the British Columbia school simply consisted of certain chapters assigned for pupils of intermediate and senior grade from Britain's Nature Study and Elementary Agriculture. Whilst it was always possible to base a great deal of valuable work upon the topics treated in Britton's book, the tendency to reproduce for examination purposes the information supplied in the book was so prevalent amongst the teachers that it was decided to frame a graduated course of study, by years, to consist of a topical outline with suggestions to the teacher on method. This outline of topics has been in use a little over a year. It was regarded as tentative, and we are planning to make a revision of it during the present year, so as to incorporate valuable recommendations and eliminate certain imperfections that come to light as the course is being tried out. The course is outlined to cover seven years of public school work—three years of junior grade, two years intermediate (third reader classes) and two years senior grade (fourth reader classes). The course for junior grade (primer classes, first and second reader) includes primary or local geography with an introduction to "the earth as a whole" in

the second reader class. In the intermediate, or third reader classes, general nature study is continued and elementary agriculture is introduced and this is carried through to the end of the senior fourth or entrance class. The topics prescribed throughout are grouped under Animal Life (wild and domestic animals, birds and insects); Plant Life (wild plants, weeds, trees and shrubs); Gardening and Elementary agriculture; and Elementary Science (Physics, Chemistry, etc.). It is intended that the assignments shall be further subdivided into Autumn Work, Winter Work and Spring Work, and a teachers' Manual of Instruction in method will accompany the course as outlined.

The plan of naming the species of birds and wild animals to be studied in each year was adopted. This was also done in assigning studies with wild plants, weeds, trees, etc. Whilst this helps to insure a certain definite amount of work in all schools, it has also a tendency to place too much emphasis upon subject matter or information gained, to the disadvantage or even disregard of the real value of nature study as an educational means. The method whereby teachers and pupils together study the things of nature in their own immediate respective districts is the only correct method in nature study. It therefore becomes important as an essential of all good nature study courses that the objects presented be such as can be found throughout the province or district in which the course is to become operative. In a province like British Columbia this difficulty is well-nigh insurmountable. We hoped in part at least to get over the difficulty by allowing the teachers to substitute other species found in their respective localities for those mentioned in the course of study in case the latter were not available. It was also recommended that the teachers of each city or municipality or of a district having the same climatic and ecological conditions throughout come together in a conference or institute meeting and select a

committee of the best informed teachers of nature study whose business it would be to make the best possible adaptation of the official provincial course to their own district which when approved by the school inspector of the district or by the Education Department would become the recognized nature study course. It will probably be along this line that the best results in framing nature study courses will be arrived at.

There is also the question of optional or alternative courses in nature study. The principal of suiting the topics assigned to the locality in which the work is conducted is a matter of first importance, and as a true pedagogical principle is accepted everywhere. At once the question of city "things" versus country "things" looms up, and at first thought one is likely to jump to a conclusion and say, "Certainly the city has its own peculiar interests and activities and its nature study course should be different from that of the rural district." But wait. We must remember that it is *nature* study we are considering, and, insofar as cities are concerned, nature study is the study of such *rural things* as may yet remain in the city or that can be reproduced or conserved in it. Moreover, it must be remembered that for residential purposes cities are tolerable only as they are able to maintain those things that are essentially rural—fresh air and sunshine, trees, grass, flowers, birds and space for gardens or for poultry and domestic animals. So nature study in cities still must mean the study of the fine things of the country which, on a reduced scale, are still to be found within or adjacent to its boundaries. Its purposes may vary and also its methods, but the subject matter is not to any large extent different from that assigned in the rural school. Availability of material for study and facilities for gardening are the chief controlling factors in any district whether urban or rural.

Optional courses in nature study for schools having school gardens in which the garden becomes the basis of much

of the nature study work have also been suggested in lieu of a general nature study course which does not take cognizance of the school garden. There is much to recommend in optional courses of this kind although there is no occasion to aim at making them wholly different.

In the last analysis success in teaching nature study depends more upon the ability, the interest, the resourcefulness, and the training of the teacher than upon the course of study. As the ability of the teacher increases, the value and also the need of a formal course diminishes and vice versa.

IN MANITOBA

BY R. B. VAUGHAN, DIRECTOR OF TECHNICAL EDUCATION

The activities of the Boys' and Girls' Club is a very strong feature of the work in Manitoba, and wherever an opportunity is provided for boys and girls to get their school instruction carried across into actual operation, on their own responsibility, under supervision, it has very beneficial results.

As the success of the work depends upon the teacher's ability to adapt the agricultural information to local conditions, it would seem to be a difficult proposition to standardize the teaching for the whole of Canada, although it might be possible to adopt a standard

scheme of administration. The following is the course of study adopted in the Manitoba schools:

AGRICULTURE AND ELEMENTARY SCIENCE. (Grades V and VI).

1. The school garden for its own sake, and for the study of (a) Plants—their parts, their relation to water, light and heat; division into annuals, biennials and perennials; germination; propagation from seeds and from cuttings; (b) Insect-life in its relation to the garden.

2. Recognition of ten noxious weeds of the locality.

3. Birds—Special reference to food-habits; seed-eaters, insect-eaters, birds of prey.

4. Animals—Life-history of toad or frog, gopher or squirrel.

5. Boys' and Girls' Clubs—Activities suitable to the ages of the children and the conditions of the district should be encouraged. Full particulars of these activities may be had on application to the Extension Branch of the Manitoba Agricultural College, Winnipeg.

AGRICULTURE AND ELEMENTARY SCIENCE. (Grades VII and VIII).

1. School Garden—Continuation of work of grades V and VI, with special reference to (a) Grains and garden vegetables; (b) Insects injurious to crops; (c) Soils.

2. Birds—Economic value.

3. Farm Animals and Poultry—Recognition of different types.

4. Farm Mechanics and Physics.

5. Boys' and Girls' Clubs—Activities suitable to the ages of the children and the conditions of the district should be encouraged. Full particulars of the activities may be had on application to the Extension Branch of the Department of Agriculture, Winnipeg.

Text, "Elementary Agriculture" (Hatch and Hazelwood), W. J. Gage & Co., Price 60 cents.

THE HOME PROJECT METHOD OF TEACHING AGRICULTURE

A Series of Articles Indicating How Home Project Work is Being Developed in Various Provinces as a Factor in Agricultural Education

HOME PROJECTS IN ONTARIO

BY DR. J. B. DANDENO, INSPECTOR, ELEMENTARY AGRICULTURAL CLASSES

THE home project is recognized in Ontario as an important factor in Agricultural education, in both Public and High Schools. The projects usually take the form of experiments in garden or field, but a considerable number of projects have been undertaken in other branches of agriculture such as poultry raising, live stock, testing dairy cows, work with fruit, and also some pupils with bees. The choice of topic will depend largely upon the interest of the individual, and upon the kind of farming carried on in the locality. Whatever topics may be selected, however, the class work in the schools relates directly to this work, the project being regarded as a series of laboratory problems which are to be discussed in class, and reported upon by the individual directly concerned.

The details of management of whatever project may be chosen, will be in charge of the pupil himself, but it is expected that the teacher will concern himself directly with the guidance and supervision of the pupil in his work at home. This implies that the teacher has time and opportunity to visit the pupil in his home. On the occasions of such visits as may be made, the teacher has an excellent chance, not only to give individual instruction to the pupil, but also to become personally acquainted with the pupil to an extent not possible in any other way—certainly not in school. With large classes it is not possible to carry on much of this kind of personal work, but where it can be done, the possibilities for good are incalculable.

The extent to which home projects are being carried on in the schools may be inferred from the number of schools teaching agriculture. In 1920 there were roughly 1,800 Public and Separate Schools and 32 High Schools maintaining classes in agriculture in Ontario, nearly all of them making use of home projects. In many cases the schools, both High and Public, conduct school gardening or other projects, on the school ground or on land located near the school. Class projects such as these are scarcely less important than the individual home projects. An interesting side light of one of such school projects may be seen from the following statement taken from a letter by the Assistant Superintendent of the Brockville General Hospital:—

"The garden worked by Brockville Collegiate pupils, under the direction of Mr. J. A. Anderson, of the staff of the institute, was of great benefit to our hospital. From this garden we had potatoes, corn, beans, carrots, cucumbers, tomatoes, lettuce, onions, parsnips—sufficient to supply many days' needs. During about one month, we had corn enough to serve one whole institution twice a week. For all of which we are most grateful." M. G. ARNOLD, Assist. Sup., B.G.H.

The lessons which the individuals of a class are sure to gain from a project of this kind may be more impressive than a person at first view may realize.

As the Collegiate Institute at Brockville has no grounds suitable for a garden plot, an arrangement was made to

use the land of a vacant lot or two not far from the school.

The good resulting from the use of home projects may be summarized as follows:—

(1) The school work is linked up with the home;

(2) The pupil receives helpful and individual guidance from the teacher;

(3) The work involved is necessarily more or less original and consequently not mere memory work;

(4) The work develops independence of character.

To those who regard scholastic work as the only kind possessing real value, home projects might be considered more or less of a fad, but education means much more than mere lessons from school books. The memorizing of a piece of poetry, the solving of algebraic problems, or the translation of a chapter of Cæsar, valuable as they are, will fade from the memory long before the circumstances and incidents relating to a completed home project will have been forgotten.

ELEMENTARY AGRICULTURE AS TAUGHT IN MANITOBA BY THE HOME PROJECT METHOD

BY H. E. WOOD, DIRECTOR BOYS' AND GIRLS' CLUBS

IN Manitoba, elementary agriculture is taught on the home project plan through the Boys' and Girls' Clubs. To this end the Departments of Agriculture and Education co-operate, placing the general supervision of the clubs under the control of the Agricultural Extension Service. This plan of organization has proven most satisfactory, as club work not only receives the support of the school inspector and teachers, but of the whole community. It is particularly gratifying to find business and professional men and women, as well as those following agricultural pursuits, giving much valuable time and thought in promoting club work.

The work is divided into twelve distinct projects, which are as follows: live stock, dairying, poultry, grain growing, gardening, cookery, sewing, canning, weed mounting, insect collecting, farm mechanics, and team demonstration and stock judging. There is also the regular school work. Membership is open to any boy or girl, whether attending school or not, between the ages of ten and nineteen years. Except in the case of four sheep clubs organized in 1918, the work until last fall was of such a nature that

members commenced the work in the spring, completed it during the season and exhibited the results of their efforts at the Club Fair held in the fall.

A divisional gardening competition, carried out by the members of seven clubs under the direction and supervision of the school inspector and agricultural representative, resulted not only in many excellent gardens, but exhibits of high-class vegetables at each of these fairs. Each garden was inspected and scored during the summer.

Several clubs have been making a specialty of having a number of their older boys each year grow from two to five-acre plots of registered wheat and oats. This year, at the Manitoba Soils Products Exhibition, exhibits of very high-class seed were made by members of these clubs. As a new feature, cow-testing was taken up by about ten clubs last year, one club having 55 cows under test. This work was carried on in close co-operation with the Dominion Dairy Branch. At some centres the creamery manager did the testing, while at other points the testing was carried on in the school.

During 1920, a special feature was made of team demonstration work. Three lines were introduced, canning, dyeing, and cow-testing. Three members, twelve years or over, composed a team, and they had to be actually enrolled as members of the project they were demonstrating. Demonstration work, in a word, consists of showing others by actually doing and explaining each step in the process. The experiment proved a great success, and 66 girls spent ten days in Winnipeg the week of the Garden Show demonstrating and sight-seeing.

Advantage is taken of motion pictures to show others how club work is carried on.

For 1921, special emphasis is being placed on the home project idea. The work is being broadened out. Instead of raising a pair of pigs for market, some 25 members of one club have recently undertaken to own and care for a brood sow, to raise and exhibit a litter of hogs and ship co-operatively a carload of hogs to Winnipeg.

Seven carloads of certified disease-free Irish Cobbler seed potatoes have been purchased and resold to members. About fifty Junior Potato Clubs are organized, and as a follow-up a number of these clubs are organizing potato demonstration teams. Those taking up potato work are planting at least one-eighth of an acre. The Federal Division of Botany is co-operating with the Manitoba Agricultural College in inspecting these potatoes.

During the last few months four Purebred Calf clubs were started, and the number of Junior Grain-Growing clubs is also increasing. In a like manner the girls' work is receiving special attention, and it is expected that several hundred demonstration teams on a variety of subjects will be trained. A small army of willing leaders has been marshalled to render all assistance possible for the boys and girls of Manitoba to carry forward their club work.

HOME GARDENING AND HOME PROJECT METHODS, BRITISH COLUMBIA

BY J. W. GIBSON, DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

THERE are many cases where school gardening cannot be carried on successfully on account of unfavourable circumstances. Under such circumstances, supervised home projects in gardening or other agricultural work might with advantage be taken up. Even in cases where there are no particular disadvantages and where school gardening is regularly carried on, it is desirable that home-project work be included for public school boys and girls of senior grade.

Supervision by Teacher

Personal visits by the teacher to the homes of those pupils engaged in home-project work are essential. A reasonable

range of choice should first be offered to each pupil concerned. Preliminary plans for carrying out the project should be made by teacher, pupil, and parent together or, failing that, by pupil and teacher together, after which the parent's approval and co-operation should be sought. Not the least of the advantages to be derived from home-project work are consequent upon the development of this spirit of mutual sympathy and helpfulness as between parent and teacher. As most agricultural home projects extend throughout the entire season from spring until autumn or winter, it is required that the teacher in charge of the work visit the pupils' homes at least once before the summer holidays and once after, for

the purpose of inspecting the work and reporting upon it. Every teacher will of course recognize the advantages to be gained by more frequent visits.

Choice of Projects

In deciding upon suitable home projects either one of two plans may be followed: (1) the choosing of a single project which would be uniform and identical for all the members of the class, and (2) dissimilar projects, each pupil taking what best suited him and his home conditions regardless of what other members of the class were taking.

Examples of the first or uniform method would be (a) potato growing, (b) corn growing; (c) rearing a flock of chickens, etc. Such projects as these are handled in accordance with regulations framed so as to make possible a competition with prizes. The pupils taking such a project may form themselves in a club. In all such cases prizes would be awarded on points determined in part by the home score and partly on the exhibit at the school fair. In the case of pupils' home gardens, the element of uniformity may have to do with size of garden and number of varieties grown.

Educationally, the second or dissimilar project method may have more in its favour than the first or uniform project method, but it is lacking in that peculiar interest which associates with comparison of results or competition. For very young pupils the diverse or dissimilar project in home gardening is preferable. Poultry or farm animal rearing projects should not be taken by the pupils below the third reader and are best handled by fourth reader pupils. On the other hand, projects that have to do with soil cultivation are applicable to all public school grades.

It sometimes happens that all of the pupils in a school division or classroom have not equal facilities for home gardening projects. In such cases it can

usually be arranged to give other suitable projects to pupils living in homes where gardens cannot be established. Each pupil engaged in home gardening should prepare a plan of his home project garden, drawn to scale, and should have it approved by the teacher before the planting is started.

Care and Cultural Direction

It is important that home gardens should be successful from the horticultural as well as from the educational standpoint. To this end teachers should be prepared to advise as to location of garden, soil, planting, fertilizing, watering, cultivation, thinning, protection from pests, intercropping and succession of crops, and harvesting.

Correlation with Other School Subjects

School-supervised home gardening is really educational gardening. It is not the growing of crops merely for profit. To this end the teacher must give the work the best possible setting.

Composition.—At least once a week a school period should be devoted to home garden reports and a sort of round table conference held, when questions would be raised by the teacher and also by the pupils which would call for the results of observations made by the pupils individually in their home gardens and which would also challenge to new continuous observation. This exercise forms the best kind of oral composition. Each child who can write should keep a garden diary and every second week or oftener should hand in a garden report—sometimes written in connected story form, properly arranged in paragraphs, and sometimes in brief tabular form, under date. Such points as description of home garden location, size, the soil and its preparation, planning, varieties grown, source of seed, amount used and cost, method of planting, germination, description of young seedlings from week to week, kind and amount of

work done in planting, cultivation, thinning, watering, etc., description of pests and hindrances, effects of weather conditions, first flowers to bloom, first vegetables used, number of days from planting, market value of the crop and how disposed of, etc., should be dealt with in reports and garden stories.

Drawing.—Stories written descriptive of the gardens and of the crops grown should be accompanied by drawings, as illustrations.

Arithmetic.—A wide range of practical problems in arithmetic can be based upon the home project in gardening. These problems will have to do with measurements, perimeters, areas, volumes, values, accounts, etc. The teacher should write down from week to week series of questions based upon home experiences in gardening and other projects. These problems are real to the pupils; they are essentially concrete and operative, and do not deal with the usual make-believe transactions which are the basis of the usual book question in arithmetic.

A complete and accurate statement of receipts and expenditures should be compiled by each pupil during the season and submitted as part of the pupil's report on the project undertaken. This will introduce the pupil to the ordinary business forms and methods of accounting.

Nature Study and Geography.—The home garden offers an excellent field for the observational side of nature study. Each succeeding day brings some new aspect or development. The person who daily works in a garden with eyes, mind, and heart open finds there much to interest and instruct—a constant challenge to further investigation.

Here also some topics which usually relate to geography may be dealt with, such as soil study, origin of soil, kinds

and how produced, effects of rain, wind, sun, frost, etc., upon the soil and the garden plants, etc. Weather observations take on a new significance and have a new interest when linked up with daily personal experience.

The relationship of this home project work to industrial or commercial geography will also be apparent. The value of the produce raised at once causes the pupils to take an interest in market reports and marketing. The character and value of imports and exports and the great problems of transportation become topics of real interest to pupils who are themselves dealing in commodities that have real value.

Manual Training and Domestic Science

Home gardening and home project work generally, furnish what might be termed motivation in connection with the whole round of school studies. Nowhere in this more apparent than in the case of boys in manual training. It gives directness and tangibility of purpose to their work. It creates real problems demanding immediate and practical solution. It stimulates initiative and independence of action. If the boy finds that he needs a soil screen in his gardening work, or a feeding hopper in connection with his chicken-rearing project, he devotes his best attention to the making of them. Similarly the interest which girls take in the cooking of vegetable dishes, for instance, will be keener and the satisfaction greater if they can furnish the materials from their own gardens. A young girl will find new inspiration in arranging table decorations if the flowers are of her own growing.

This intimate human relationship as between school exercises on the one hand and out-of-school experiences on the other cannot fail to benefit the school and the home.

SCHOOL-HOME PROJECTS IN THE CHILLIWACK HIGH SCHOOL

BY J. C. READEY, INSTRUCTOR IN
AGRICULTURE, CHILLIWACK, B.C.

HOME projects in agriculture have been made a part of the regular instruction in agriculture in the Chilliwack High School this year for the first time. The following is the list of options presented to the students, with the regulations governing the work:—

School-home Projects in Agriculture

1. The work is intended to fit into and be a part of the regular home business. In the case of students living in town, projects suited to those conditions will be arranged.

2. The written consent of the parent or guardian is necessary before the work may be undertaken.

3. The projects are divided into majors and minors. Two minors will be accepted as one major.

4. A maximum of twenty per cent of the total school credit in agriculture will be allowed for the satisfactory completion of one major or two minors.

5. Projects not named in the accompanying list may be arranged for with the instructor.

6. Records of dates, weather, cost, and such other data as may affect results must be kept wherever they apply.

7. As far as possible the result of the work itself must be exhibited at the annual School Fair. In all cases the records must be shown.

8. Advice, suggestions, and information should be obtained by the student from every available source. Especially should the student consult with his or her parents and neighbours, the Agricultural College, University of British Columbia, and the Dominion Experimental Farm at Agassiz.

9. The student is required to assume full responsibility for the project and is expected to do as much of the actual work as time will permit.

10. In each case the minimum amount of work is stated. Students may take larger areas or amounts but are cautioned against undertaking more than time and money will permit being well done.

Agronomy

1. Spray a field of potatoes for late blight, not less than $\frac{1}{4}$ acre. Minor.

2. Grow a cereal crop of not less than one acre. Major.

3. Make a survey and supervise the drainage of at least one acre. Major.

4. Grow a crop of corn for ensilage, not less than two acres. Major.

5. Grow a crop of mangels, not less than one-quarter acre. Major.

Poultry

1. Crate-fatten at least twelve chickens. Minor.

2. Operate an incubator using at least 100 eggs. Minor.

3. Hatch, and raise to first laying period not less than fifty pullets. Major.

4. Take over the management of the home flock of poultry, not less than fifty, from the first of January to the thirty-first of December. Major.

Live Stock

1. Raise a bunch of hogs, not less than six, from weaning to marketing. Major.

2. Keep feed and milk records of at least four cows for ten months. Major.

3. Halter-break, fit, and show a draft colt at the Chilliwack exhibition. Minor.

4. Care for a flock of not less than twelve sheep for a year. Major.

Farm Management

1. Draw a set of plans for a barn to accommodate twenty head of cattle and three horses, with silos and milk-room.

Give list of material and itemized statement of cost of completed building. Show the position of the barn as it would appear on a particular Chilliwack farm. Major.

2. Draw to scale a plan of the home farm. Determine the distance from the horse stable to the intertillage field gate and the number of trips made during the season (1) without implements, (2) with implements, and the average time required to make the trip. Major.

3. Given eight thousand dollars in cash, prepare a plan for the disposition of this amount in the purchase, equipment, and management for the first season of a twenty-acre farm located within five miles of Chilliwack. Major.

4. Keep the cost account of one enterprise on the home farm. Minor.

Rural Economics

1. Determine the crop yields and market prices of at least three crops within a radius of three miles of your home. Major.

2. Make a farm animal census over a district within a radius of three miles from your home. Major.

3. Find the average number of farmers' autos that are in town on at least ten Saturday evenings during the year. Determine the capital cost, depreciation, interest, and up-keep charges on this average. Major.

4. Prepare a statement showing the relative amounts expended for churches, schools, roads, and public amusements in this district during the year. Major.

Horticulture

1. Prepare for, plant, and manage for one season not less than one-eighth of an acre of strawberries, or one-quarter acre of bush fruits. Major.

2. Renew an old orchard, not less than twelve trees, by doing the necessary cultivation, pruning, spraying and grafting. Major.

3. Plan and conduct a home garden of not less than 5,000 square feet. Major.

4. Make and care for a hot bed, not less than 40 square feet in area, supplying the home needs and selling the surplus. Not less than three crops. Minor.

Parent's Consent

I hereby certify that I understand the purpose of the School-Home Agricultural Projects of the Chilliwack High School and agree that

(student's name) shall have the time, advice, and finances necessary to

(carry out project) during the year.

I also agree to permit h to exhibit the result of h work at the first Chilliwack School Fair following the completion of the project.

Signed,

..... Parent.

..... Guardian.

The object in introducing the home project has been three-fold. First, to link up the interests of school and home; second, to develop ability in independent effort, and third, to give concreteness to the class discussions. The home project will not displace the High School outdoor laboratory, familiarly but erroneously called the "garden." The home project is a practical, every-day job which is a part of or closely allied to rural home activities, undertaken by young people who are making an intensive study of the science underlying that particular job. On the other hand the High School garden is a laboratory for the elucidation of those sciences underlying the rural home activities.

It is yet too soon to say what the value of the school-home project will be. It has created already a very live interest among the members of the class and has met with unanimous and even enthusiastic approval from the parents.

TEACHING BY MEANS OF HOME PROJECT, NOVA SCOTIA

L. A. DEWOLFE, B.A., M.S.C., DIRECTOR OF RURAL SCIENCE SCHOOLS, TRURO, N.S.

IN Nova Scotia, home projects are in the hands of the individual teachers.

We follow no general system, and no pressure except moral suasion is brought to bear on these teachers. We have no means of compelling such work, as it is not required in our school course. We have no weapon to hold over the teachers to demand such effort; it is wholly optional on their part.

Possibly thirty or forty teachers are doing creditable work by the project

method. Very many teachers have organized Garden clubs and Improvement clubs. Under the influence of the Department of Agriculture, a number of Poultry clubs and a few Live Stock clubs have been organized. Unfortunately, however, the teacher rarely possesses the ability to make these broadly educative.

We are not progressing; for our trained teachers leave us before they have made a lasting impression on their schools or their communities.

HOME PROJECT WORK IN THE SCHOOLS OF NEW BRUNSWICK

BY A. C. GORHAM, DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION, DEPARTMENT OF AGRICULTURE

NATURE Study and Agricultural Instruction is obligatory in the elementary schools of New Brunswick. For high schools agricultural botany is prescribed by the Board of Education. This work is inspected by the regular inspectors of schools.

Besides the class-room course in Nature Study and Agriculture mentioned above, other activities are carried on through the schools by the Department of Agriculture to further the cause of agricultural education. These optional phases of the work are as follows: establishing of School Gardens; Summer Science School to prepare teachers to take up this work; project work with Poultry and Home Gardens; School Fairs.

I wish to write particularly of the project work. The project is the logical

outgrowth of good teaching. The genuine teacher will correlate this practical work with the class room studies and lead the pupils to master the problems which must arise from such exercises. The boy or girl is interested because he or she is allowed to choose within certain limits the kind of project they wish to carry out. It is his to work on his own initiative. Thus he feels the responsibility. He endeavours to follow brief instruction and produce a crop or a flock of chickens. In brief it is purposeful experience.

Last year over 3,800 boys and girls planted and cultivated more than 4,500 home plots. Instructions were pretty thoroughly carried out and results were very encouraging.

LEADERSHIP

FROM AN ADDRESS BY MISS ABBIE DELURY, DIRECTOR, HOMEMAKER'S DEPARTMENT,
UNIVERSITY OF SASKATCHEWAN

It is regrettable that to many of us the memory of our childhood on the farm revives only thought of continuous hard work. These are not the memories we love to cherish and live over again in our minds; but those we strive to forget. It is very true that we are workers, and of necessity must be, to accomplish our mission here. We have our own work; and no one can do it for us. It is ours—our very own. But, fortunately, we are equipped for our life work, we possess the necessary faculties, although they are latent within us, when we are born. We must study ourselves to know our special gifts, and then develop these. All this requires of every individual a persistent effort. Work is the universal coin. If we are willing to pay the set price, we can demand anything, but we must present the price in full, before we can deservedly accept what we desire to obtain. Thus, it is very apparent that to live a successful life, we must be a worker. We must like work; we must know how to work. Love for work and efficiency are both the fruits of continuous hard labour. But, in spite of this, life—a complete life—consists not of work alone. We instinctively crave relaxation and recreation. Varied activities are necessary to permit the expression, and to promote the development of all the positive human impulses. In the absence of such activities, we cannot grow, we cannot do our best work, we cannot be happy.

Make Rural Life Socially Attractive

People, the younger ones in particular, are not satisfied with rural life as it is to-day. The young people are flocking to our cities because of the monotony and drudgery of rural life. Those

who remain, at least many, are not contented, and their development is dwarfed. Regarding those who go to the city—it might be well to compare, in our minds, city and country life. Rural life can be made ideal, city life sometimes can, but life in a city is less natural and more restrained, because of the congestion of people. As yet, there is nothing particularly elevating and cultural about the life in our western cities, except what the few people of real culture and refinement contribute. Our city life, in general, is very primitive and crude. Well, then, since our cities have nothing desirable to offer except educational institutions, would it not be to the best interest of our young people to turn their thoughts and energies towards rural life, and aim to make it attractive, and with sufficient scope to allow for the expression of all the positive human impulses?

To begin, we must have leaders, and surely there are trained men and women, in nearly every community, gifted with talents for leadership. We are certain they are to be found. In passing, let us ask these most important questions: (1) Will those who are qualified accept the responsibility of leadership? (2) Will the community accept or recognize these men and women as leaders, and pledge its support? When we really become interested, we shall have no difficulty in securing leaders, and those chosen will succeed, because of their own talents and our sympathetic co-operation.

For leadership, we need talented people with latent talents at least. Those who are at all familiar with our children and young people will grant that they are resourceful and gifted. They possess unlimited talents. People may say, we have no talent for music, debating,

dramatic or literary work. These statements are false, and insults to our young people, and signify only the blindness of the observer. The young people are gifted, but their talents are often obscured because of lack of means of development. Considering the material, there is absolutely no limit to the number of community activities we might initiate. We shall, however, suggest only a few, which ought to be organized in every community.

A Debating Society

Many men and women find themselves to-day in positions where they must express their thoughts in public. Many have worthwhile thoughts, which are the fruits of free thinking and broad life experiences, but they cannot express them—they cannot convey them to others. They lack confidence, and sometimes words. The confidence develops with experience. Such people feel the need of training for expression, and a debating society will bring the desired opportunities. In debating, the faculties for expression are developed, but this is not all, knowledge is gained. In the discussion of a topic, the outlook as a whole broadens. The ideal training for expression should begin, in the junior grades in our schools, and continued through the grades. The children love it, and quickly master speaking, because they are not self-conscious. It is not enough to train people to think. They need also the power of expressing their thoughts, in as beautiful language as possible, and with as much grace and ease as possible. A debating society provides unlimited scope for the development of all the talents of a community in logic and expression.

Music and Dramatics

The time cannot be far off when each community will have its own orchestra and musical club. Already there are a few communities which have accomplished this, and not because they were blessed with a large number of specially

trained people, but because they had a man or woman with a vision and will, who saw what was needed, and started to work. In the past, people had not time to interest themselves in music; but now that the simple necessities of life have been provided, people are ready for that which stimulates the higher development of the individual. In speaking of music, we must not forget community singing. Let us get together and sing the songs we knew when children. These old songs will bring before us a picture of home, of childhood, and kindle about us the kindly influences, which then surrounded us, and send us on our way through life with renewed faith and courage. Music not only delights, it inspires. Its value can never be put in words.

It has often been said that children are born actors. It is little wonder, then, that plays make such a strong appeal to young people, and awakens such a quick response. The children love nothing better than acting, and they do it admirably because they are not self-conscious. The young people love it, too, for it involves such scope for action and expression. There are in the province a number of amateur dramatic societies, and they are doing a splendid work for themselves and their community. Those who participate, invest their talents and receive unheard of dividends; besides, they provide entertainment which is both pleasing and inspiring for the whole community.

Reading Clubs

The people, a few years ago, worked from sunrise to sundown, and at the close of the day their energies were spent. They desired only sleep. They had no time for reading. Those who had read extensively, by force of circumstances, had to leave their beloved friends on the shelves, year after year. It is very true that when people are physically tired, their mentality is at its lowest ebb. It is then impossible to read a book and enjoy it; to inquire into the theme; to remember it. Thus, even booklovers ceased to

read. People now have a little time, and this they want to invest. They cannot do better than spend their spare moments with our worth while authors. Those who know books know what to choose. This class does not concern us. It is those whose knowledge of books is limited and superficial, and who have no interest in books, and have never read anything worth while that need help. They lack even the most elementary working knowledge. For the benefit of this class reading clubs are organized by those who love books and enjoy them. To illustrate—Mrs. Jones is a lover of George Eliot's books. She has read the author's life. She knows her personality and outlook. She invites a number of women, who know nothing of these books, to come to her house an evening or two each week. She tells them about the author's life, and reads aloud one of her books. In reading, Mrs. Jones conveys to her hearers a degree of her own deep appreciation of the book. Their interest is awakened. They will be interested in

the author's other books and read these alone. Mr. Gray is interested in Economics. He invites the men to joint with him in reading and discussing this subject. All these efforts in themselves may seem small and insignificant, but all will stimulate the interest in books. It is interesting to remember, in this connection, that some of our most interesting and delightful men and women have educated themselves by reading. Further, they have a vision of the ideal, and a passion for the ideal, which few men and women educated in our best universities can claim their own.

Every community has leaders, and young people possessing unlimited talents. With all these resources rural life can be made attractive, and so broad that people will find scope for work, relaxation and recreation. Then it will no longer be necessary for people to journey thousands of miles to live a few months of each year. They will find life at home, in their own community, throughout the entire year.

THE LIVE STOCK PROJECT OF THE MANITOBA BOYS' AND GIRL'S CLUBS TO BE ENLARGED

BY H. E. WOOD, IN CHARGE OF BOYS' AND GIRLS' CLUBS

Since the inception of Boy's and Girls' Clubs in Manitoba, the care and feeding of live stock has been one of the most important lines of work carried on by the members. Back in 1912 the work began with a number of boys and girls undertaking to feed and look after a pair of pigs which, later were exhibited at the first club fairs. During the past season a visitor at almost any one of the 220 fairs held in the province saw the members exhibiting pigs, calves, sheep and colts, that they themselves had cared for and trained. Live stock rearing, as a project in the club programme, still occupies the premier position.

During November and December, several of the clubs that had made a particularly good showing in live stock made

an effort to place the live stock project on an even broader foundation. The character of the exhibits of stock at club fairs convinced many people, especially farmers, that the work being undertaken by members of these clubs is of a constructive nature and of lasting benefit. Club officers, however, felt that an even more comprehensive plan could be launched upon; and to this end several Junior Live Stock Clubs have been started. Instead of securing a pair of pigs, about the first of May, and feeding these until they are exhibited at the fair in the fall, and then selling them to the butcher, members of the Junior Pig Club will secure a good brood sow in the fall or during the winter, rear a litter of pigs, and thus become actual breeders

rather than just feeders. This will give the boy the option of carrying on this work throughout the whole year and at the same time give him the opportunity of acquiring the fundamental principles underlying the science of animal husbandry. Incidentally, it should be the means of establishing the member as a

breeder of pure-bred live stock. In a word, the boy that undertakes this work not only should learn how to feed and care for stock, but should be instructed in the science of animal judging, and at the same time be building up a small herd of stock which is his own property.

CHILDREN'S LIVE STOCK COMPETITIONS AT THE EDMONTON, ALBERTA, SPRING LIVE STOCK SHOW

The Edmonton Spring Live Stock Show offers \$2,120 in cash, besides other special prizes and donations, to winners in the Children's Calf Feeding, Sheep Feeding and Swine Feeding Competitions.

Prizes and awards are donated by The Swift Canadian Company, Ltd., The P. Burns Company, Ltd., The Edmonton Stock Yards, The Dominion Department of Agriculture, The Dominion Shorthorn Breeders' Association, The Alberta Shorthorn Breeders' Association, The Canadian Hereford Breeders' Association, The Alberta Hereford Breeders' Association, The American and Canadian Aberdeen Angus Associations, The Alberta Aberdeen Angus Association,

The Holstein-Friesian Association of Canada, The Canadian Ayrshire Breeders' Association, His Honour, the Lieutenant Governor, The Hudson Bay Company, besides numerous business firms and individuals. The Calf Feeding Competition is divided into Beef and Dairy classes.

Complimentary Luncheon

The Swift Canadian Co., Ltd., of Edmonton, have arranged to take all the boys and girls who make entry in the Children's Competitions, on a special trip of inspection through their packing plant. A luncheon will then be given the children in the big dining room.

CHILDREN'S CALF COMPETITION AT THE WESTERN FAIR, LONDON, ONT.

The Western Fair Association, London, Ont., will hold a boys' and girls' calf competition at their 1921 exhibition. This competition will be open to any boy or girl over ten and under seventeen years of age, resident in Canada. The

calves shown may be pure-bred or grade of any beef breed calved on or after September 1, 1921. All grade calves must have a registered sire; \$1,000 will be offered in prizes, the first prize to be \$100.

WINTER COURSE IN AGRICULTURE AT THE MOOSEJAW COLLEGIATE INSTITUTE

An opportunity is presented to boys and girls of Moosejaw and the surrounding districts to enter the Moosejaw Collegiate after the fall work of the farm has been completed and spend the winter in study along lines that have a direct bearing on either what is to be their later life work or which will always closely relate to every other occupation in Saskatchewan.

The course extends over a period of three or four months, depending upon

the time that spring work commences on the farm. It is the second course of its kind offered by the Institute, and is designed to appeal to boys and girls from the farm who have acquired only an elementary education.

The course of studies includes instruction in Field Husbandry, Animal Husbandry, Dairying, Poultry, Horticulture and Forestry, Agricultural Engineering, Rural Economics, Household Science, and various academic subjects.



PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

SUNFLOWERS SILAGE FOR THE WEST

BY PROFESSOR G. H. HUTTON, SUPERINTENDENT OF AGRICULTURE AND ANIMAL INDUSTRY,
CANADIAN PACIFIC RAILWAY

THE developments of the last three years have brought the sunflower to the front as one of the most satisfactory crops that can be grown for silage purposes. It has been proven by experiments and extensive private feeding trials that the sunflower yields well, the silage is palatable, and is at least equal, if not superior, pound for pound, to corn silage. Many comparisons made between corn silage of the best quality and sunflower silage have shown the balance of economy of gain in beef cattle and yield of milk in dairy cattle in favour of the sunflower.

The experiments carried on by the Agricultural and Animal Industry Branch of the Department of Natural Resources of the Canadian Pacific Railway were not conducted with corn of the highest quality for the reason that in the particular locality in which this test was conducted it is not possible to bring corn to the dough stage every year. In consequence the corn used could not be considered as having reached the most desirable stage of maturity to produce the highest quality of silage. However, comparisons were also made with peas and oats silage and sunflower silage and were strikingly in favour of the sunflower. The peas and oats of course had reached the point of prime fitness for silage and gave a very satisfactory yield of about seven tons to the acre. But pound for pound they were not equal to

the sunflower crop when fed to dairy cattle, and the yield from the latter was almost thirty-five tons to the acre, or five times as great as the yield of peas and oats.

The following table indicates the yield in green weight per acre of sunflowers, corn, and peas and oats, the moisture content at the time the crops were put in the silos, and the yield in dry matter per acre:—

Kind of Crop.	Yield per acre in pounds	Per cent Mois- ture.	Yield per acre in lbs.
	Green Weight.		Dry Matter.
Sunflowers	79,200	82.41	12,034
Corn	27,980	78.72	5,745
Peas and oats . .	14,000	62.64	5,230

The same machinery that is used for the handling of the corn crop is used for the harvesting of the sunflower crop. For seeding we use an ordinary grain drill, stopping up the spouts to sow in rows about thirty-six inches apart. If the seed is of high quality five pounds per acre will distribute it so that the plants will be from three to four inches apart in the row, which is sufficiently thick. We have seeded five, ten and fifteen pounds per acre, and believe that five pounds per acre under ordinary conditions will prove about right. The seed cost twenty-two cents per pound in 1920, and will cost about fifteen cents in 1921

for the best grade of Russian Giant sunflower seed, which is a black seed with white stripes, and which we believe out-yields any other strain.

The crop responds to cultivation as quickly as does the corn crop and is ready to be put in the silo at about the same season. It should be cut when about forty per cent in bloom, or when the first plants to bloom have reached the dough stage. After having gone through the cutting box the sunflowers are in finer particles than corn, and in consequence pack more densely in the silo, permitting of greater than the rated tonnage being stored.

This crop has proven a suitable one to be grown under irrigation and has also proven very satisfactory as a dry land crop. In fact its ability to resist drouth is one of its strong points. The Experimental Station at Scott, Saskatchewan, reports a yield of about six tons per

acre with a precipitation of less than two inches during the growing season. Another important feature is its ability to withstand frost. At the University of Alberta in 1920 a very striking evidence was given of the difference between this crop and corn since the growth of the sunflower did not appear to be delayed by a frost which caused a decided check in the growth of corn planted alongside the sunflower crop. It has been stated by some authorities that the sunflower will stand six degrees of frost without injury.

From the experience I have had with this crop I am satisfied that it will be developed until it is one of the main forage crops in the West, and because of its adaptability to a wide variety of conditions such as drouth; its suitability for irrigation; its resistance to frost; and its high feed value, it will mean millions of dollars of increased wealth to the stock growers of this country.

SEED CENTRES

BY L. H. NEWMAN, SECRETARY, CANADIAN SEED GROWERS' ASSOCIATION

IT is probably safe to say that nothing of greater importance to agriculture has been revealed by careful experiments than has the difference that exists in the producing ability of different varieties, strains, and qualities of seed. Every practical farmer who has profited by his observations is alive to the importance of using not only the variety best suited to his own particular conditions of soil and region, but seed belonging to high-producing strains of that variety and which, in itself, excels in vitality and vigour. The enormous national importance of the use of the very best seed is impelling. For many years the importance of this problem has been recognized in a greater or lesser degree by those concerned officially, and otherwise, in the welfare of agriculture, and many agencies have been at work

with a view to effecting an improvement in the general situation. Among these agencies might be mentioned the field crop competitions, seed fairs, the work of the Ontario Experimental Union, and of the Canadian Seed Growers' Association. While these various organizations have undoubtedly accomplished a good deal, yet we must admit that the situation is by no means in as good a position as it should be. Many may be surprised to know that investigation reveals the fact that even at this late date quite a large percentage of farmers do not even know the names of the varieties they are growing. Many continue to grow the same grain year after year, admitting that their yields are not what they should be, but attaching the blame entirely or largely to soil and seasonal

conditions. Other farmers are continually changing their seed without law or order, and with utter disregard for results obtained in comparative trials at Experimental Stations or elsewhere.

Unfortunately, the farmer who is most lacking in information is not the farmer that is being reached by any of the above-mentioned organizations. How to reach this type of farmer is, and probably will continue to be, a very large and more or less insoluble problem. Looking at this question from the standpoint of a practical farmer, one cannot help but come to the conclusion that the most effective and practical method by which more farmers will be brought to sow better seed each year will consist in some plan whereby seed of particularly good breeding and quality may be produced in quantity within reasonable reach of every farm, and at a reasonable price. The suggesting of any plan such as this may savour of the idealistic and may not be entirely practicable. On the other hand, if some general plan could be worked out, having the above situation as its objective, a great public service might be rendered.

In seeking to work towards such a plan, it would seem advisable to utilize, as far as possible, existing organizations. Of these, probably the most helpful are the field crop competitions, in which several thousand farmers participate each year. These competitions, undoubtedly, have done a great deal to interest farmers in better seed, although, as already intimated, they do not reach the class of farmer who is most in need of help. They have not, so far, provided a source of high-class seed of approved varieties to the extent that they might. In order to remedy this condition, steps are being taken to award prizes, not only on the basis of the standing crop, but also on grain threshed therefrom.

Demand for Registered Seed

A question which naturally arises is: What is the demand for registered seed

and what premiums over market prices may be expected for this class of seed? Perhaps this question may best be answered by saying that the market has never yet been glutted with a really superior article. At the present moment the Canadian Seed Growers' Association is endeavouring to assemble in Ontario a number of carloads of registered Banner oats. Strange as it may seem, the supply to meet the ordinary demands of the trade is not adequate. In spite of the fact that Ontario harvested a splendid crop of oats last season in most parts, yet, when it comes to getting together in any one district a carload of registered Banner oats, one immediately runs into difficulties.

During the past few years enormous quantities of seed oats and wheat have been purchased in Canada by the Seed Purchasing Commission appointed by the Federal Government, with headquarters at Regina, Sask. The duty of this commission was to find seed grain of a certain standard for needy municipalities in Western Canada. The municipalities paid for the seed and sold it to farmers usually on time. The commission, as well as the department which it represents, has come to the conclusion that the time has arrived when no public or other organization is justified in facilitating the distribution of seed of a lower grade than that required by the standards set for registered seed.

Many Seed Centres Needed

It is an interesting and noteworthy fact that practically ideal conditions are necessary for the production of the best grade of seed. Such conditions, unfortunately, are never enjoyed by an entire province. Looking back for the past fifteen years, I should say that not more than 25 per cent of the total cultivated area in Ontario during average years was favoured with conditions suitable for the production of really first-class seed. Taking Canada as a whole, I find that

of all samples sent in for examination, pending registration, only about 20 per cent are good enough to merit this recognition. This fact demands that seed centres be not only numerous, but be widely scattered. Some years the efforts of growers in certain centres will reward them with very little, if any, extra remunerations, while others may profit handsomely. The following year the reverse may be the case. Having in mind the demand for registered seed, together with the vagaries and uncertainties of season, the average farmer should accept as a matter of good business the general rule to sow only registered seed, to give this seed the very best opportunity, and so take a chance of harvesting a crop which may be eligible for registration and which will pay him well to handle for seed.

I cannot think of any action on the part of agricultural representatives which would bring quicker and more far-reaching results than by seeing to it that at least one good seed-producing centre be established in each of their respective districts. If this can be accomplished through the medium of field crop competitions, well and good; but if this does not promise to work out satisfactorily, steps should be taken to locate, if possible, a suitable section where high-class seed of the kind most in demand may be produced to a high degree of perfection and in considerable quantity. In 1913 the Canadian Seed Growers' Association, in co-operation with the agricultural representatives of Ontario, undertook a province-wide campaign to establish a large number of these centres. The foundation was laid for sixty-two such centres, but at the present time there are less than half a dozen

which are of any consequence. Of these, probably the North Gower Banner Oat Centre, situated in Carleton county, near Ottawa, is the most noteworthy. This year this centre will have approximately 3,000 bushels of registered Banner oats to offer. Each year since the centre became established there has been a very creditable lot of seed available, and all registered seed has been sold at a very satisfactory premium above the current market price. The success of this centre may be attributed very largely to the fact that it is situated within easy reach of the headquarters of the Canadian Seed Growers' Association, whose officers have been able as a result to follow the work from year to year, to encourage the growers, and to assist in the disposal of their product. Our experience clearly shows that a definite follow-up system is imperative. To do this efficiently requires more time than the average agricultural representative has at his disposal to give. The province of Quebec is overcoming this situation, and incidentally making rapid strides, by having a special field crop officer whose duty it is to follow up the work in the different seed-producing centres.

The Agricultural School at Kemptville, Ont., will this year offer several hundred bushels of excellent seed oats, barley, and wheat. This institution in this one particular alone is destined to render an exceedingly useful service to eastern Ontario.

The Canadian Seed Growers' Association is organized to check up the details of the work of producing high-class seed, to issue certificates of registration, and to attach the final seal to all sacks of registered seed merchandised.

THE FRUIT INDUSTRY OF THE OKANAGAN VALLEY, BRITISH COLUMBIA

BY H. H. EVANS, DISTRICT INSPECTOR, VERNON, B.C.

IN British Columbia, as in any other country where new agricultural ventures are undertaken, many have been the mistakes in the earlier years of development. This is true of the fruit-growing industry of the Okanagan Valley, to a considerable extent, but, today, with the experience gained, the orchardists of the Valley are now at a point where they realize that attention to organization and the practical application of the scientific principles of fruit growing are two necessary factors in attaining success.

Orchard Management

In the interior valley of British Columbia, lying within the area known as the "Dry Belt," where irrigation is generally practised, the system of orchard management obviously presents different phases to those exhibited in sections where the rainfall is sufficient to give the trees the necessary amount of moisture. It may be stated that, as a general rule, fruit trees under irrigation have a tendency to come into bearing at an earlier age than in other sections. Many varieties start to bear four years after planting and in eight years are bearing heavy crops. On this account it is essential that close attention be paid to the details of pruning incidental to tree development, inasmuch as it is essential that a strong structure be created to carry the crop. There are several phases of orchard management which must be considered, viz.:—Selection of suitable varieties, cultivation, irrigation, cover crops, fertilization, pruning, spraying and thinning. Most of these considerations obviously enter into correct orchard practices in all fruit-growing sections

and I shall draw attention only to those that are peculiar to the Dry Belt as they vary from the fruit-growing practices of other sections in Canada.

Selection of Varieties

It is now recognized that certain varieties are peculiarly adapted to individual conditions of the different fruit-growing sections of Canada. In the early days of the industry in British Columbia this point was not fully realized and the early plantings were of varieties which are now known to be unsuitable. At the present time growers working in co-operation with the officials of the provincial Department of Agriculture, have a very fair understanding of the commercial varieties which excel in each of the fruit-growing districts of the province. Some years ago a tentative schedule of the suitable varieties for the various districts was drawn up by the provincial Department of Agriculture, and this schedule has been improved upon to such an extent that we are able to state with a reasonable degree of accuracy the varieties which may be commercially planted in any given district. The schedule furthermore, is elastic and allows scope for the addition of new varieties which are appearing from time to time. So far as the Okanagan irrigated districts are concerned, the following varieties are now known to excel under dry, irrigated conditions:—

Apples—

Winter Banana
McIntosh Red
Wealthy
Duchess
Rome Beauty
Delicious
Jonathan
Wagner

Newtown Pippin
Winesap
Y. Transparent
Salome
Ben Davis
Gano
Northern Spy

Pears—

Bartlett
Flemish Beauty
Clapps
Douyen De Comice
Beurre Anjou
Beurre Diel
Clairgeau
Dr. Jules Guyot

Winter Nellis
Howell
Duchess
d'Angouleme

Crab Apples—

Transcendent
Hyslop

Plums—

Peach Plum
Bradshaw
Black Diamond
Ponds Seedling
Yellow Egg
Tragedy
Columbia
Italian Prune

Cherries—

Bing
Lambert
Royal Anne
Black Tartarian
Montmorency
E. Morello
Duke

Cultivation, Cover Crops and Fertilizers

Clean cultivation has been the rule for a number of years in Okanagan orchards. Owing to the hot, dry climate, this method of orchard management has steadily depleted the amount of humus in the soil and has materially affected the fertility of the soil. During the past few years this depleted condition of soil fertility has been forced very much to the front, and in order to build up the soil and increase its humus content, the provincial department is conducting a series of soil fertility experiments with cover crops, commercial fertilizers, lime, manure and sulphur, in combination and individually, to determine the most satisfactory, practical and economical method of re-establishing the desired condition. The fruit growers likewise have appreciated the fact that while clean cultivation has forced their trees into stronger growth and earlier bearing, they have thereby sacrificed the necessary soil constituents, and they are now fully alive to the necessity of building up their soils.

We have such conditions as Baldwin Spot, Drought Spot, Rossette and Wilt, and similar physiological conditions, which obviously relate to depleted soil conditions, and the experiments conducted to date appear to point most definitely to the fact that these troubles may be largely obviated, if not entirely

eliminated, by improving the humus content of the soil combined with the addition of certain necessary soil elements. We are not at the present time in full possession of the most desirable procedure to follow, but it is hoped that in the course of the next few years we will be able to place before the orchardists of British Columbia a clear statement on the best methods for re-establishing the soil. There are many aspects of the question which require careful consideration, and the matter of the soil itself is not necessarily the most important.

Irrigation

The soils of the Okanagan Valley are largely volcanic in origin. The annual precipitation for the entire valley averages about 14 inches in the year. Consequently, it may be readily seen that the soils in the "Dry Belt" are of very little value without the application of water. An adequate supply of water is one of the necessary adjuncts to successful fruit growing. Furthermore, it is vitally essential that the moisture content of the soil be maintained in an even manner, and every effort must be made to prevent soils drying out by intermittent or haphazard methods of irrigation. The water supply is very largely in the hands of water companies who distribute the water on a pro rata basis of so many acre feet. Under average conditions the approximate amount of from 2 to 2½ acre feet is necessary on upland soils. It would be as well to state, however, that experiments are being conducted at the Dominion Experimental Farm, Summerland, B.C., and by the Provincial Department of Agriculture to ascertain precisely the amount of water necessary to produce the best results.

Pruning

The systematic pruning of fruit trees in the Okanagan Valley, is a general practice adopted by the great majority

of fruit growers. While there is still great need for further study on the influence of pruning on wood and fruit development, the system that is at present generally recommended is one that tends to develop a semi-pyramid type of head with a modified leader. Particular attention is given to the angles formed between the branches of the main trunk. These angles should be as nearly as possible right angles, and the main limbs must be from 5 to 8 evenly spaced up and around the central leader in its first 5 to 8 feet of growth, after which the central leader is dispensed with and the whole head of the tree encouraged to maintain uniform development. A moderate annual pruning is generally recommended.

Spraying

The fruit growers of the Okanagan Valley are not troubled with such insects as the Codling Moth, San José Scale, Plum Curculio, Apple Maggot. Nevertheless, such pests as the Aphids, Red Spiders and Blister Mites, etc., are more or less common, and these pests are used as a reason to continue and build up our system of pest control.

Of the diseases, Powdery Mildew is distributed throughout the entire Valley. At least two applications of Lime Sulphur during the spring and early summer are needed to keep it under control. Apple Scab is distributed only in the northern end of the valley and this disease is readily controlled by two applications of lime sulphur in the early summer. The other diseases that are well distributed are Peach Mildew

and Plum Rot. Of the bacterial diseases, Fire Blight is pre-eminently the most important diseases attacking some fruit trees, and it would appear that the irrigation conditions produce a more virulent type of attack than in districts where the precipitation is natural and normal. The importance of this disease necessitates careful attention.

Packing and Marketing

The packing and marketing problem of the Okanagan Valley has passed through some interesting stages. The bitter experience gained in the years 1912-15 by the lack of a proper system of organization both in the valley and in the markets, forced growers to pay particular attention to the development of this aspect of their industry. Co-operative organizations have been formed during the past few years, resulting in the use of mechanical graders and the proper wrapping and box-packing of the fruit. The question of advertising has received close attention by the co-operative organizations with the result that it may be safely stated that the product of the Okanagan Valley is now recognized as one of the highest grades of horticultural products in the markets of the prairies and the east.

In summing up, while it may be accepted that the problems of the fruit growers in the Okanagan are similar to the problems of fruit growers elsewhere, we may say that the secret of success is the practical application of efficient, scientific methods, with the necessary degree of co-operation and co-ordination of effort interlocking every phase and branch of the work.

AGRICULTURAL PRODUCTION OF CANADA

BY ERNEST H. GODFREY, F.S.S., CHIEF, AGRICULTURAL DIVISION, DOMINION BUREAU OF STATISTICS, OTTAWA

IT would seem as if, after the extraordinarily abundant season of 1915,

Nature had become somewhat exhausted through prodigality, for each of the four succeeding seasons, 1916 to 1919, were, for grain crops, continuously inferior, the yields per acre for wheat being only 17, 15½, 11, and 10 bushels per acre, as compared with 26 bushels in 1915 and with 16½ bushels, the average for the ten years 1910-19. The season of 1920, though not equal to early anticipations, came as a welcome change from the four preceding adverse years. The harvest, upon the whole, proved to be one of the best ever reaped in Canada, and has done much to bring renewed hope and confidence in these difficult times to the farming community.

Season of 1919-20

For 1919-20 the winter was one of exceptional severity, but the killing of winter-sown wheat, amounting only to 4 per cent of the area sown, proved to be the smallest on record. This was due to the depth of the snow and to the late spring, by which the young crop escaped to a large extent the damaging effects of alternate frost and thaw. The seeding season for spring grains was later than in any previous year on record, and the delay in getting on to the land caused farmers considerable apprehension; but when the season actually opened in May the weather proved so favourable that rapid progress compensated for the later start, and at the end of May the condition of the grain crops

was only slightly below average and compared quite favourably with what it was at the corresponding dates of recent years. Conditions remained favourable during June, but hot, dry weather during the earlier part of July in Saskatchewan made the situation somewhat precarious. Fortunately good rains fell during the last week of the month, just in time to effect a decided improvement in the prospects for a good wheat crop. An attack of grasshoppers threatened to assume very serious proportions in Saskatchewan, but the damage was minimized, and the worst effects were averted by an energetic poisoning campaign under Government direction.

Areas and Yields of Principal Field Crops

In the following table are given the areas sown, the total yields and the yields per acre of all the principal field crops of Canada for the year 1920, as compared with 1919. The areas are as officially estimated by the Dominion and Provincial Governments as the result of the compilation of schedules collected from individual farmers in June, and the yields for 1920 are as finally estimated by the Dominion Bureau of Statistics in co-operation and agreement with the provincial Departments of Agriculture, and, for Quebec, with the Quebec Bureau of Statistics. A column is added showing the average yields per acre for the decennial period 1910-19:—

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Field Crops	1919	1920	1919	1920	1919	1920	10-year average 1910-19
	acres	acres	bush.	bush.	bush. per acre	bush. per acre	bush. per acre
Spring wheat.....	18,453,175	17,418,241	177,254,400	243,720,100	9.50	14.00	16.50
Fall wheat.....	672,793	814,133	16,006,000	19,469,200	23.75	24.00	22.50
All wheat.....	19,125,968	18,232,374	193,260,400	263,189,300	10.00	14.50	16.75
Oats.....	14,952,114	15,849,928	394,387,000	530,709,700	26.25	33.50	33.25
Barley.....	2,645,509	2,551,919	56,389,400	63,310,550	21.25	24.75	25.75
Rye.....	753,081	649,654	10,207,400	11,306,400	13.50	17.50	16.00
Peas.....	230,351	186,348	3,406,300	3,528,100	14.75	19.00	15.75
Beans.....	83,577	72,163	1,388,600	1,265,300	16.50	17.50	16.25
Buckwheat.....	444,732	378,476	10,550,800	8,994,700	23.50	23.75	23.00
Flax.....	1,093,115	1,428,164	5,472,800	7,997,700	5.00	5.60	9.40
Mixed grains.....	901,612	811,634	27,851,700	32,420,700	31.00	40.00	33.25
Corn for husking.....	264,607	291,650	16,940,500	14,334,800	64.00	49.25	53.75
Potatoes.....	818,767	784,544	125,574,900	133,831,400	153.50	170.50	146.00
Turnips, etc.....	317,296	290,286	112,288,600	116,390,900	354.00	401.00	352.25
			tons	tons	tons per acre	tons per acre	tons per acre
Hay and clover.....	10,595,383	10,379,292	16,348,000	13,338,700	1.55	1.30	1.50
Fodder corn.....	511,769	588,977	4,942,760	5,641,750	9.75	9.60	8.85
Sugar beets.....	24,500	36,288	240,000	412,400	9.80	11.37	9.10
Alfalfa.....	226,869	238,556	494,200	583,790	2.20	2.45	2.40

From this table it will be observed that the final estimate of wheat for all Canada is 263,189,300 bushels, which is nearly 70,000,000 bushels more than in 1919, whilst the oat crop gave the truly remarkable yield of nearly 531,000,000 bushels, the largest for any one year in the history of Canada.

The bulk of the wheat crop of Canada is now produced in the three Prairie Provinces, and indeed more than half of it is grown in the single province of Saskatchewan. In the following statement is shown how the total production of wheat, oats, barley, rye, and flax is divided as between Eastern Canada, the Prairie Provinces, and British Columbia:—

Crops	Eastern Canada	Prairie Provinces	British Columbia	Total
	000 bush.	000 bush.	000 bush.	000 bush.
Wheat.....	28,177	234,138	874	263,189
Oats.....	214,750	314,297	1,663	530,710
Barley.....	22,186	40,761	364	63,311
Rye.....	2,894	8,274	1.38	11,306
Flax.....	409	7,589	...	7,998

Value of Field Crops, 1920

Partly due to the war and partly to increased production, the total value of the field crops of Canada has of late years expanded annually in a very remarkable degree. At the close of the last century, the census of 1901 showed that the total value of the field crops of

Canada was \$194,953,420. It was not until 1911 that the Dominion Government began to estimate the value of field crops annually. In that year the total was not more than \$597,926,000. For 1919 the estimated total was \$1,452,437,500. For 1920 the final estimate shows the record total of \$1,455,244,050 as the value of the year's field crops. In the

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Following table this sum is distributed between the various crops for 1920 with comparative figures for the two previous years:—

Field Crops	1918		1919		1920	
	Per bush.	Total	Per bush.	Total	Per bush.	Total
	\$	\$	\$	\$		
Wheat.....	2.02	381,677,700	1.89	364,857,000	1.62	427,357,300
Oats.....	0.78	331,357,400	0.80	317,097,000	0.53	280,115,400
Barley.....	1.00	77,378,670	1.37	77,462,700	0.83	52,821,400
Rye.....	1.49	12,728,600	1.40	14,240,000	1.33	15,085,650
Peas.....	2.99	12,899,100	2.86	9,739,300	2.42	8,534,300
Beans.....	5.41	19,283,900	4.48	6,214,800	3.88	4,918,100
Buckwheat.....	1.58	18,018,100	1.50	15,831,000	1.28	11,512,500
Mixed grains.....	1.14	40,726,500	1.36	37,775,400	0.90	29,236,200
Flax.....	3.13	18,951,000	4.13	22,609,500	1.94	15,502,200
Corn for husking.....	1.75	24,902,800	1.30	22,080,000	1.16	16,593,400
Potatoes.....	0.98	102,235,300	0.95	118,894,200	0.97	129,803,300
Turnips, etc.....	0.43	52,252,000	0.50	54,958,700	0.41	48,212,700
Hay and clover.....	per ton 16.25	241,277,300	per ton 20.72	338,713,200	per ton 26.10	348,166,200
Grain hay.....			29.00	4,379,000	33.12	4,518,000
Alfalfa.....	17.84	7,963,500	21.85	10,800,200	23.79	13,887,700
Fodder corn.....	6.15	29,439,100	6.92	34,179,500	7.75	43,701,000
Sugar beets.....	10.25	1,845,000	10.86	2,606,000	12.80	5,278,700
Total.....		1,372,935,970		1,452,437,500		1,455,244,050

By provinces, the total value for the same years is as follows:—

Province	1918	1919	1920
	\$	\$	\$
Prince Edward Island.....	16,277,800	22,067,200	18,530,400
Nova Scotia.....	42,486,200	63,086,000	47,846,550
New Brunswick.....	42,891,270	52,834,000	46,357,300
Quebec.....	276,776,900	307,944,000	330,251,000
Ontario.....	384,013,900	373,507,500	375,746,900
Manitoba.....	180,507,500	162,462,200	133,989,900
Saskatchewan.....	299,362,100	296,831,800	271,213,000
Alberta.....	113,072,700	149,580,800	204,291,500
British Columbia.....	17,547,600	24,124,000	27,017,500
Total.....	1,372,935,970	1,452,437,500	1,455,244,050

Miscellaneous Products

In addition to the field crops already described, brief mention may be made of several minor agricultural industries, which though relatively unimportant, are by no means negligible.

Great progress has of late been made in the cultivation of tobacco in Quebec, and in the southern parts of Ontario. For 1920 the area in tobacco is estimated at 53,114 acres (33,000 acres in Quebec and 20,114 acres in Ontario), as compared with a total of 31,586 acres in 1919. The yield for 1920 is estimated at 48,088,500 pounds, of the value of \$13,106,550, as compared with 33,770,000 pounds of the value of \$15,548,000 in 1919.

The cultivation of flax for fibre and of flax fibre seed for export to Ireland is a new Canadian industry, established as a consequence of the war. Including subsidiary products, the total value of fibre flax and fibre seed amounted to \$5,523,900 in 1919, as compared with \$2,285,769 in 1918.

In Ontario there are three sugar factories which manufacture sugar from Canadian grown beets. During the last few years, the acreage and production have increased considerably. In 1918 the production of refined beetroot sugar amounted to 50,092,835 pounds the highest on record, and representing a growth from 21,329,689 pounds in 1911. In 1919 the production was 37,839,271

pounds. The value was \$4,358,077 in 1918 and \$3,924,411 in 1919, the whole-sale price per pound being therefore 8·7 cents in 1918 and 10·4 cents in 1919.

Maple Sugar is a valuable by-product of Canadian farming, especially in Quebec and Ontario. There are no official annual estimates of production; but experts place the output at something less than 20,000,000 pounds of which about three-quarters are produced in Quebec. For 1920, the Quebec Bureau of Statistics places the production of maple sugar at 15,615,141 pounds, as compared with 12,155,448 pounds in 1919, and of maple syrup at 1,449,649 gallons, as compared with 1,470,775 gallons in 1919. The total industry in Canada represents an annual value of about \$2,000,000 and is carried on by about 50,000 growers.

The commercial production of apples in Canada for the year 1919 is officially placed at 3,334,660 barrels of the value of \$24,396,210, distributed by provinces as follows: Nova Scotia, 1,600,000 barrels, value \$9,989,680; New Brunswick, 40,000 barrels, value \$307,400; Quebec, 70,500 barrels, value \$527,950; Ontario, 878,860 barrels, value \$7,030,880 and British Columbia, 745,300 barrels, value

\$6,540,300. Fruit trees, bushes and plants were sold by nurserymen in Canada in 1919 to the value of \$227,627.

A recent bulletin of the Dominion Bureau of Statistics states that the total value of the fur-farming industry of Canada in 1919 was \$3,978,026, comprising \$878,568, the value of land and pens, and \$3,099,458, the value of fur-bearing animals. The total number of pelts produced by Canadian fur farms in 1919 was 2,548 of the value of \$508,079, the number from Prince Edward Island alone being 1,570 of the value of \$368,654.

The total value of the products of the dairy factories of Canada in 1919 amounted to \$135,196,602, as compared with \$107,340,850 in 1918.

Farm Live Stock

On November 3, the Dominion Bureau of Statistics reported the numbers of farm live stock in Canada as at June 15 last. The following table gives the total of each description (horses, cattle, sheep, swine and poultry) in 1920, as compared with the two previous years.

Description	1918	1919	1920
	No.	No.	No.
Horses.....	3,609,257	3,667,369	3,400,352
Milch Cows.....	3,538,600	3,548,437	3,530,238
Other Cattle.....	6,507,267	6,536,574	5,947,142
Total Cattle.....	10,045,867	10,085,011	9,477,380
Sheep.....	3,052,748	3,421,958	3,720,783
Swine.....	4,289,682	4,040,070	3,516,678
Poultry:			
Hens.....	31,334,498	31,785,722	25,942,105
Turkeys.....	1,061,982	839,711 ¹	791,766 ¹
Geese.....	879,177	802,869 ¹	754,455 ¹
Ducks.....	884,034	777,692 ¹	617,638 ¹
Total Poultry.....	34,159,691	34,645,238 ²	30,505,819 ²

¹ Not including Alberta. ² Including 439,244 other than hens in Alberta.

³ Including 2,399,855 poultry of all kinds in Alberta.

For all descriptions of farm live stock, excepting sheep, the numbers of live stock in 1920 were less than in 1919. Sheep, which for so many years before 1917, were declining in numbers, show a further satisfactory increase, the number 3,720,783, constituting an advance

of 298,825 over last year's record total of 3,421,958. Comparing the numbers of all live stock in 1920 by provinces, Prince Edward Island showed an increase for all descriptions. In the other provinces horses show a decrease in all provinces, except British Columbia,

where the number is 44,070, as compared with 43,717. Cattle show a decrease in all provinces, except Prince Edward Island. Sheep have increased in all provinces, excepting Manitoba. Poultry, including all descriptions, have increased in Prince Edward Island, Manitoba and British Columbia, but have declined in Nova Scotia, New Brunswick, Quebec, Ontario, Saskatchewan and Alberta.

The total value of the farm live stock of Canada (horses, cattle, sheep and swine) in 1919 was estimated at \$1,296,602,000. For 1920 the total value is \$1,041,246,000, comprising \$361,328,000 for horses; \$282,419,040 for milch cows; \$279,080,960 for other cattle; \$37,263,000 for sheep, and \$81,155,000 for swine.

The value of farm poultry in 1920 is estimated at \$37,016,000.

Total Value of Agricultural Production, 1920

Using the data available for the purpose, it may be roughly calculated that the gross value of the agricultural production of Canada for the year 1920 amounts to about \$1,976,168,000, made up of the following items: Field crops, \$1,455,244,000; year's revenue from farm animals, including wool, \$151,924,000; dairy products, \$256,000,000; fruits and vegetables, \$40,000,000; poultry and eggs, \$50,000,000; miscellaneous, including tobacco, flax and maple products, \$23,000,000.

CANADA'S MEAT INDUSTRY

CANADA'S meat-packing industry had a record year in 1919, according to the report recently issued by the Dominion Bureau of Statistics. The total value of products was placed at \$233,936,913. The cost of materials was given as \$175,133,821, and the quantity was 778,479,174 pounds dressed weight. The number of beeves slaughtered was 694,394; sheep 523,998; hogs, 2,296,252; calves, 199,621.

Great strides have been made in the development of the industry in Western Canada. Ontario still retained the leadership by a wide margin with a total capital invested of \$50,232,669; Alberta is credited with \$17,598,091; Quebec, \$10,613,712; Manitoba, \$9,059,507; British Columbia, \$3,045,808, and Saskatchewan, \$2,170,533. Of the 82 plants from

which returns were received, 28 were in Ontario, 15 in Quebec, nine in Prince Edward Island, seven in Alberta and Manitoba, six in British Columbia and in New Brunswick, and two in Saskatchewan. The total capital invested was given as \$93,363,791.

The number of employees was 11,770 male and 1,452 female, and the total salaries and wage was \$15,302,388. The cost of fuel used was \$1,033,913.

Products

The quantity and the selling value at the factory or works of the meats, fresh, cured and canned, and of all by-products of the industry are given in the accompanying table.

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Classes of products.	Quantity	Value
Meats sold fresh—		
Beef. (lbs)	317,467,956	\$ 57,581,831
Mutton. "	22,553,283	5,068,615
Pork. "	53,343,432	14,776,888
Veal. "	20,309,526	3,698,402
All other. "	1,167,010	328,994
Meats, cured—		
Beef, salted or cured. "	12,105,182	2,203,225
Pork, salted. "	90,379,798	27,659,867
Hams. "	76,302,075	25,928,198
Shoulders. "	17,603,271	4,931,363
Bacon and sides. "	84,294,846	31,212,706
Sausage, fresh and cured. "	27,151,818	6,712,217
Canned goods. "	18,397,335	7,649,013
Lard. "	41,894,907	12,623,265
Tallow. "	14,219,539	2,055,109
Oleo and other oils. (gals.)	1,791,438	752,689
Oleomargarine. (lbs.)	10,084,377	2,655,181
Stearine. "	173,167	45,914
Animal tankage. (tons)	19,769	893,225
Bone, raw, ground, etc. "	9,836	590,058
Complete fertilizers. "	3,506	405,505
Glue. (lbs.)	252,778	45,268
Gelatine. "	5,625,403	1,758,700
Hides (581,012). "	31,239,916	9,649,120
Skins, sheep. (no.)	436,713	1,225,243
Skins, calf. (no.)	169,318	1,263,379
Wool. (lbs.)	16,044	9,513
Hair. "	802,396	39,248
All other products.		12,164,441
Received for custom or contract work		9,736
Total selling value.		\$233,936,913

UNITED STATES CROP SUMMARY FOR 1920

Crop.	1920.	1919.	1914-18. Average
Corn. (bush.)	3,232,367,000	2,858,509,000	2,760,484,000
Oats. "	1,526,055,000	1,231,754,000	1,414,558,000
Wheat. "	787,128,000	934,265,000	822,246,000
Barley. "	202,024,000	161,345,000	214,819,000
Rye. "	69,318,000	88,909,000	59,933,000
Buckwheat. "	13,789,000	15,244,000	15,305,000
Flax seed. "	10,990,000	7,661,000	12,922,000
Potatoes. "	430,458,000	355,773,000	382,113,000
Clover seed. "	1,760,000	1,341,000	.....
Hay. (tons)	108,233,000	109,152,000	99,304,000
Sugar beets. "	8,545,000	6,421,000	6,050,000
Tobacco. (lbs.)	1,508,064,000	1,454,725,000	1,187,708,000
Apples. (bbls.)	80,000,000	51,000,000	74,000,000

STALLION ENROLMENT, 1920

Pure Breeds	P. E. I.	N. S.	N. B.	Que.	Ont.	Man.	Sask.	Alta.	B. C.	Breed Totals
Clydesdale.....	21	36		100	930	491	908	387	4	2,967
Percheron.....	4	7		113	325	310	784	471	4	2,018
Shire.....				2	32	10	27	42		113
Suffolk.....				1	4	7	18	19		39
Belgian.....				65	22	53	186	109		435
French Draft.....										
French Canadian.....		2		69	11	3				85
Standard Bred.....	16	35		69	240	17	25	9		411
Thoroughbred.....				1	16	1	2	4		24
Hackney.....		2		11	36	5	6	2		62
German Coach.....		1		2	2	1	2	1		9
Saddle Horse.....					8	2				14
American Trotting.....										
Morgan.....				1				1		2
Irish Hunter.....										
Ponies and Morgans.....					5					5
Jacks.....										
Interim Enrolment Certificates—Pure-bred.....			120				2,050	315		2,485
Totals.....	41	83	120	436	1,631	900	4,100	1,360	8	8,679
Grades.....	37	42	5	554			252	204	2	1,096
Interim Enrolment Certificates— Grades.....								75		75
Scrubs.....										
Total number of horses enrolled in each province.....	78	125	125	990	1,631	900		1,639	10	9,850

A CAMPAIGN FOR TREE PLANTING

CANADIAN FORESTRY ASSOCIATION

On the Prairies

The Canadian Forestry Association's novel scheme for rallying the interest of the prairie farmers in the planting of trees by sending a travelling moving picture show through the West has met with uncommon success. The "Tree Planting Car" consisted of an ordinary railway coach, equipped with motion picture machine. The car served as an auditorium capable of seating about one hundred persons. During the trip, lectures were given at 95 points. The work was in charge of Mr. Archibald Mitchell, who gives the following account of the campaign.

"We have just about reached the summit of our trip across the prairie and back, and are now turning our faces eastwards for a few months of work in Saskatchewan and Manitoba. So far, we have met some five thousand people in meetings in the car and scores besides, singly or in groups, all interested in tree growing on the prairie in some of its phases. Very rarely indeed have the meetings not begun on time, and often six o'clock has found us still discussing somebody's tree problem after the three o'clock meeting, and many a time the eight o'clock gathering has closed at eleven or half-past.

"Interest? There is no end to the interest; people are hungry for tree and plant information. The questions asked are both numerous and varied and range from the depth to sow Caragana seed to what to do with a plantation when the grass has taken possession of it, or 'Why is it my house plants don't grow?' 'What varieties of apples and crabs would you advise for this country?' and 'Why is it the evergreens I transplanted from the hills did not grow?' or 'How would you set about planting a shelter belt across the farm?' Some were not easy to answer at first, but usually a few questions are enough to get at the root of the trouble, and we have always managed to find some solution that seemed to fit the matter in hand. It is interesting, too, how one's theories are confirmed time and again by some one who has reached the same result by following the same processes as we have been advocating. Such testimony is very valuable, and never fails to impress. It is at the same time very encouraging to the speaker.

Is the Dry Prairie Fatal?

"A very striking instance of this occurred at Lethbridge, where Mr. N. J. Anderson, of Barnwell, confirmed all we had said

regarding the possibility of growing trees on the dry prairie. Some people in the irrigated sections especially are very sceptical as to dry land tree growing, more particularly in the last three or four years, when everything has been so dry, and it was refreshing, to say the least, when Mr. Anderson was able to endorse everything we had been saying. Trees do so well with irrigation, planted even singly, and with very little cultivation afterwards, that the tendency is to expect the dry land trees to succeed in the same way, and with little or no attention afterwards, a mistake which is fatal every time.

A Real Success

"A visit to Mr. Anderson's place on our way to Taber bore out everything he had said. His trees were obtained from the Government, the same as anybody else could get. They were planted in 1917, just at the beginning of the dry years, and yet he had a full stand, nearly every tree growing, many of them 14 feet high now, a splendid example of what can be done in a very short time by carrying out instructions and using a little energy and common sense. On inquiry, it was found he had made a perfect summer-fallow preparation, having ploughed the land deep about the end of May, the year previous to planting, and keeping it well tilled all summer. The years 1918 and 1919 were dry, but Mr. Anderson believed in the irrigation of the cultivator, and persevered, keeping the ground stirred all summer and free from weeds. The result is those trees have grown to all appearance as well as if the usual rainfall had taken place. Fourteen feet high is as good as can be expected in any three years with normal rainfall without irrigation, and is enough to satisfy anybody. The whole plantation is a demonstration of what can be done in tree growing, even in dry years, when correct methods are carried out.

Aiding Town Schemes

"Every town or village has its own local tree problem; sometimes the wrong trees are being used; sometimes they are being injured by a too frequent use of the sprinkler, actually being injured by kindness, and sometimes attacks of insects or fungus do damage. At every place we try to go through the town before the first meeting, taking in the local tree troubles and successes, so that we can speak intelligently on whatever may turn up, and advise accordingly.

"We have seen a great deal of damage from soil-drift in our travels, and whenever that is mentioned it is not difficult getting people's attention.

Crops Blown Out

"Mr. Anderson's plantation is a striking example of the advantages of tree belts in checking soil-drift. His trees are in three belts, about 40 rods apart, running north and south. Immediately west of the outer one there is a crop of flax which is the result of the third seeding this year, the two previous crops being blown away completely. For six miles west of him the crops and soil were completely blown away, and yet no drift passed through the third strip to his house and garden. His belts are too narrow for perfect success as self-sustaining plantations on dry land, being only 3 to 6 rows wide. If they had been six rows wide, little or no drift would have passed through the first one, and the whole field would have been completely sheltered.

"Three other well-treed places were passed on the way to Taber—standing

rebukes to every other farm in the vicinity and shining examples of what can be done even in the driest year on the prairie in the way of tree growing.

Time Lost, Time Gained

"During the whole trip we did not hear a man question the fact that trees would help the country—help it in retaining snow in winter and prevent evaporation in summer, afford shelter from the winds and help to keep the land inside the fences.

"Of this there is never any doubt, the question is to find the time; and when the method of planting two acres of tree easily, quickly and well, is presented, it leaves them thinking. They see it, and they also see that two or three days taken from the middle of their wheat seeding is not time lost.

"The truth is, the people are really tree hungry, but like everything else one does not understand, they are afraid to tackle it. They forget that the planting of a tree belt is, after all, only a short job; but it is a completed job, and the time taken will never be missed out of the year's work."

NEWS ITEMS AND NOTES

The National Dairy Council of Canada announces a propaganda to educate the public so that they will know and appreciate the fact that milk and its products are among the best and cheapest foods in the world. The council believes that the public should be made to understand that healthy children cannot be reared unless they are given lots of milk to drink and plenty of the products of milk to eat; and that grown people, to enjoy good health, should use milk or its products abundantly in their every day diet. While this work will result in much benefit to the health and well being of the Canadian people, it will also develop a much larger and steadier home market for milk, cream, butter and cheese.

The Council has engaged Miss Olive E. Hayes, a Canadian lady who has had special training and experience as a speaker and writer on the food values of dairy products, to take charge of its educational and publicity department. The Council, through this department, will assist and co-operate with Public Health Associations, Child Welfare organizations, and other kindred societies in campaigns of addresses to school children, women's clubs, public meetings and newspaper articles to bring about a greater

consumption of the health-giving and health-preserving foods which milk and its products have proved to be. Miss Hayes will commence her work on the 1st of March, 1921. It is expected that several child welfare and public health organizations of Toronto, with the co-operation of this Council, will put on a milk campaign in that city in March next. Whenever, in any part of Canada, there is a desire to have a milk campaign, the Council will be glad to assist and co-operate in making a success of the movement. The offices of the Council are in the Central Chambers, Ottawa.

The Chancellor of the Exchequer recently announced in the British House of Commons that the Ministry of Food would be disbanded at the end of March, and it is thought that this will be the last of food control in the Old Country, for the present at any rate.

In the January-February edition of the Agricultural Gazette an article entitled "Relation of Birds to Crops" was credited to Miss Ruby Mills, Secretary of the Hamilton Bird Protection Society. This article

was prepared by Miss Laura B. Durand, Secretary of the Canadian Society for the Protection of Birds, and was read before the Wentworth Teachers' Convention in October last.

Miss Durand has just returned from a month's field work in Wentworth and Halton counties, where she gave 39 addresses in the rural schools on the subject of bird protection.

Dr. F. C. Harrison, Principal of Macdonald College, was elected as President of the Society of American Bacteriologists, at the annual meeting held at Chicago, Dec. 28-30, 1920. The Society has a membership of about one thousand.

Professor H. Barton left Macdonald College on Jan. 21, for Ayr, Scotland, where he goes at the invitation of the Ayrshire Cattle Herdbook Society of Great Britain and Ireland, to judge at their fair.

The necessity of a campaign of unvarying efficiency against the common brown rat is an outstanding one, states W.B. Bell, of the United States Biological Survey, in an article entitled *The Rat—A World Menace*, appearing in the Weekly News Letter of the United States Department of Agriculture. No other animal or insect, continues the writer, is so dangerous and persistent an enemy, and no other enemy succeeds in inflicting the damage that the rat annually imposes upon humanity. The rat population of the United States is at least equal to the human population, and the same ratio holds true for practically every country under the sun. The Bureau of Biological Survey, places the value of the food and property destroyed annually by each individual rat at \$2. Keeping well within the boundaries of conservatism this means that each year, in that country alone, is produced \$200,000,000 worth of food to no other purpose than to feed rats. In another way 200,000 men in the United States are devoting all their labor to the maintenance of 100,000,000 rats.

The year 1920 was the most successful in the history of the school exhibition movement in Saskatchewan, 250 fairs being held, an increase of 43 over the year previous.

The Department of Agriculture for Saskatchewan reports that in 1920 there were 1798 schools entered in gopher destruction contests; that 2,019,233 gophers were destroyed at a cost of \$3,159.

The School Gopher Contests conducted for four years by the Saskatchewan Department of Agriculture will this year be discontinued. They resulted in the destruction of millions of gophers, but have served their purpose as a medium whereby the children of the rural schools might contribute to the saving of food during the war period.

As a means of popularizing Canadian fruits in Britain, the proposal has been made that a "Canadian Fruit Week" be held this year, according to a report of J. Forsyth Smith, Fruit Trade Commissioner to the Department of Trade and Commerce, from London. Mr. Smith also states that a national apple day may be held as a part of a general campaign of advertising.

Brown-tail Moth work started in Nova Scotia on December 1, 1920. Two Dominion and two provincial scouts are engaged on the work, which is carried on under the direction of Mr. F. C. Gilliatt, as general foreman. A severe outbreak was found at Bridgetown, which fortunately appears to be local in character.

The first consignment of nursery stock from Europe for British Columbia via the Panama Canal arrived at the port of Vancouver on December 28. The shipment arrived in a very poor condition due to over heating and the plants were practically valueless.

Dr. J. H. McDunnough has been appointed editor of "The Canadian Entomologist" in place of Dr. E. M. Walker, of the University of Toronto, who has resigned owing to pressure of university work.

The live stock breeders of Oxford county Ontario, have organized a Stock Improvement Association as a branch of the Ontario Cattle Breeders' Association, with the object of getting rid of the scrub sire. As soon as possible a census of all scrub bulls in the county will be taken, and then more definite plans will be made for their substitution by pure-bred animals. G. R. Green of Woodstock is Secretary-Treasurer.

Loans aggregating to \$80,302,649 have been made to 19,931 soldiers in the Dominion. Courses in agriculture have been completed by 1,500 prospective veteran settlers, and 916 men are still in training.

The Dairy and Cold Storage Branch of the Federal Department of Agriculture was represented at the convention of the

Eastern Ontario Dairymen's Association at Cobourg, in January, by Messrs. J. A. Ruddick, Commissioner; George H. Barr, Chief Dairy Division, H. W. Cleman, Dairy Produce Grader, and A. H. White, Senior Dairy Promoter. Mr. Ruddick gave an address on the Official Grading and Control of Dairy Produce for Export.

Messrs. Ruddick, Barr and White were also in attendance at the convention of the Western Ontario Dairymen, held at London, and delivered addresses.

At the convention of the Nova Scotia Dairymen at Bridgetown, in January, Mr. Ruddick gave an address on the Progress of the Dairy Industry, and Mr. Barr on the Dominion Educational Butter Scoring Contest.

At the Charlottetown convention of Prince Edward Island Dairymen, Mr. Ruddick spoke on the Progress of Dairying.

Mr. E. S. Archibald, Director of Experimental Farms, was present at the annual convention of the Dairymen's Association of Eastern Ontario on January 6, and gave an address on "The Cost of Milk Production." Mr. Archibald also attended the Western Dairymen's Convention at London on January 12, and spoke upon the subject of "The Economic Feeding of Dairy Cattle."

Mr. Arthur Gibson and Dr. J. M. Swaine represented the Entomological Branch at the meetings of the Entomological Society of America and the American Association of Economic Entomologists held in Chicago, Ill., December 26-31, in affiliation with the American Association for the Advancement of Science. Mr. Gibson was elected first vice-president of the Entomological Society of America and was elected to a similar office in the American Association of Economic Entomologists. The A.A.A.S. meetings will be held in Toronto this year, and it is expected that arrangements will be made to hold joint meetings of the above two Societies and the Entomological Society of Ontario.

Mr. Arthur Gibson, Dominion Entomologist, has recently been appointed a member of the Advisory Board on Wild Life Protection. Mr. Gibson will represent the Department of Agriculture on the Board.

Mr. Arthur Gibson, F.E.S., F.E.S.A., Dominion Entomologist, recently attended a joint meeting of the Montreal Entomological Society and the Montreal Natural History Society, and gave an illustrated talk on the work of the Entomological

Branch of the Dominion Department of Agriculture.

At the Annual Convention of the Western Canada Fruit Jobbers' Association held in Winnipeg, January 12 and 13, R. G. L. Clarke, District Fruit Inspector for B. C. and Mr. F. H. Steele, District Fruit Inspector for the Prairies, represented the Dominion Fruit Branch.

Mr. C. W. Baxter, Dominion Fruit Commissioner, addressed the Nova Scotia Fruit Growers on "Marketing and Distribution," at the Annual Meeting held at Windsor in January.

Mr. R. G. L. Clarke, District Fruit Inspector for British Columbia, represented the Fruit Branch at the Annual Meeting of the British Columbia Growers, held at Nelson, B. C., January 19-21.

The Dominion Chemist, Dr. Frank T. Shutt, addressed the annual meeting of Dominion Land Surveyors held in Ottawa on February 2 and 3, 1921, on the subject "Soils and their Characteristics."

The Annual Convention of the Manitoba Beekeepers' Association held in Winnipeg on January 18, was attended by Mr. F. W. L. Sladen, Dominion Apiarist, who gave two addresses, entitled "The Reduction of Labour in the Prevention of Swarming," and "Bee Diseases."

Mr. M. B. Davis, B. S. A., Assistant in Pomology at the Experimental Farms Branch, attended the annual convention of the Nova Scotia Fruit Growers' Association on January 19, and addressed the gathering on Orchard Pruning and Fertilization. A summary of Mr. Davis' paper on pruning will be found in this issue.

The annual meeting of the Ontario Horticultural Association, held at Toronto in February, was attended by Mr. W. T. Macoun, Dominion Horticulturist, who presented the report of the Committee on "Names and Varieties."

"Work in Pomology at the Central Experimental Farm and its value to farmers and fruit growers of Eastern Ontario," was the subject of an address at the Agricultural School, Kemptville, Ontario, given recently by the Assistant in Pomology, Mr. M. B. Davis.

The Dairymen's Convention of the district of Beauharnois held at Ormstown, Que., on January 11, was attended by the Dominion Live Stock Commissioner, Mr. H. S. Arkell, who addressed the meeting on the "Possibilities of Dairying."

The Dominion Live Stock Commissioner was represented at the annual meeting of the Live Stock Associations of the Province of Manitoba, held at Brandon early in January, by Mr. C. M. MacRae, B.S.A., who spoke upon the subject "Federal Assistance to Horse Breeding."

Mr. George B. Rothwell, Dominion Animal Husbandman, addressed the convention of the Beauharnois Breeders' Association held at Ormstown, Que., on January 11, on "Improving the Dairy Herd."

Mr. Grant S. Peart, Chief, Markets Intelligence Division of the Seed Branch, Dominion Department of Agriculture, attended the meetings of the Ontario Experimental Union at Guelph on January 11 and 12, giving an address entitled "An Analysis of Sweet Clover Seed Markets."

Over twenty-five per cent of the elementary schools in New Zealand are provided with facilities for the instruction of girls in household science.

In view of the decision of the Ontario Minister of Agriculture to transfer the Ontario Veterinary College from Toronto to Guelph, arrangements are being made to proceed with the new building when spring opens. The plans have been approved for a structure costing \$200,000. It is believed that the change which will bring the institution into close touch with the Ontario Agricultural College, will result in a better co-ordination of work and add to efficiency.

A new Dairy Building and a Memorial Hall will be added to the Agricultural

College buildings in the near future. The dairy building will serve the purpose of a Dairy School and will be up-to-date in all respects. The Memorial Hall, the cost of which is being met by private subscription, will be an imposing structure and will appropriately commemorate the many students and ex-students of the institution who lost their lives in the World War.

The annual convention of the Ontario Fruit Growers' Association, held at Toronto on February 16 and 17, was attended by Mr. C. W. Baxter, Fruit Commissioner, who spoke on the establishment of an Ontario Sales' Agency for apples.

Mr. G. E. McIntosh, Fruit Transportation Specialist, was also in attendance and addressed the convention on the subject of "Carriers' Protective Service." Mr. Baxter states that the conference was one of the most successful in many years.

The Dominion Department of Agriculture was represented at the official opening of the Kemptville Agricultural School by the Director of Experimental Farms, Mr. E. S. Archibald. Mr. Archibald also addressed the gathering of short course students in the afternoon.

Mr. G. E. McIntosh, Fruit Transportation Specialist of the Dominion Department of Agriculture delivered an address at the annual convention of the Niagara District Fruit Growers' Association February 23 to 25, dealing with the question of the distribution of Ontario fruits and the extension of markets.

On page 79 of the Agricultural Gazette' last issue, it is mentioned that the team representing the University of British Columbia in the Judging Competition at the Pacific International at Portland was in charge of Professor Clement. Professor King, who is now Acting-Head of the Department of Animal Husbandry, should be given credit for this work.

APPOINTMENTS AND STAFF CHANGES

DOMINION DEPARTMENT OF AGRICULTURE

Dr. F. C. Craighead, late of the Bureau of Entomology, Washington, D.C., arrived in Ottawa at the beginning of the New Year to take up his duties as Entomologist in the Division of Forest Insects, Entomological Branch.

Dr. A. E. Cameron resigned from the Entomological Branch, as from October 1, 1920, to accept the Professorship of Zoology at the University of Saskatchewan.

Mr. Wilfred H. Wright, B.S.A., was appointed early in January as Supervising Seed Analyst at Calgary. At the Ontario Agricultural College, Guelph, from which he graduated in 1912, Mr. Wright specialized in Biology. He enlisted with the 153rd Battalion, but sustained injuries that left him unfit for service in France. He was later given charge of the Battalion Schools at Shorncliffe, and after his return to Canada in February, 1918, was made Lecturer in Botany at the Ontario Agricultural College.

Mr. Frank E. Foulds, B.Sc. (Agr.) has been appointed Supervising Seed Analyst at the Dominion Seed Laboratory, Winnipeg. Mr. Foulds took a combined course in Arts and Agriculture at McMaster University, Toronto, and the Ontario Agricultural College, Guelph. He graduated in 1916, was with the Dominion Laboratory of Plant Pathology at St. Catharines, Ontario, for several months, and then enlisted. Following demobilization, he attended Faculty of Education at the University of Toronto, and has recently been in charge of the Science and Agriculture Department at the Clinton Collegiate Institute.

Mr. A. C. McCulloch has severed his connection with the New Brunswick Department of Agriculture, where for some time past he has been Superintendent of the Poultry Division, and has been appointed to the position of Poultry Promoter for the Live Stock Branch in Manitoba.

ONTARIO

Mr. L. G. Heimpel, B.S.A., who has been on the staff at the Kemptville Agricultural School as instructor in Farm Mechanics and Drainage, resigned his position on February 12, to take the position of agricultural advisor with the Fordson Tractor Company.

NEW BRUNSWICK

The appointment of Mr. Harvey Mitchell as Deputy Minister of Agriculture for New Brunswick was announced at the first of the New Year. Since March 31 of last year, when he resigned his connection with the Federal Dairy Division, Mr. Mitchell had given his attention to his farm at Keswick, from whence he was called to oversee the department with which he had formerly been connected as Dairy Superintendent.

His record as a promoter of the dairy industry in the Maritime Provinces dates back to 1894. In that year, Mr. Mitchell joined the staff of the New Brunswick Department of Agriculture as Dairy Superintendent, which position he filled until 1907, when he became Maritime Representative of the Dairy Division, Ottawa. In 1896, he introduced the co-operative plan of operating cheese factories and creameries in New Brunswick; also the division of proceeds according to percentage of butter fat. Previous to this, the milk was practically all bought outright and paid for at a stated price per one hundred pounds, regardless of fat content.

On becoming Maritime Representative of the Dairy Division in 1907, he introduced Cow Testing for the improvement of dairy herds in his territory. From 1907 until 1916, he continued to supervise Cow Testing in Nova Scotia, New Brunswick and Prince Edward Island. During this period Mr. Mitchell assisted in the establishment of central creameries in Nova Scotia and Prince Edward Island. The years 1915-16 were spent in carrying out a special propaganda for an improvement in the quality of Prince Edward Island cheese.

In 1917, Mr. Mitchell carried the gospel of the necessity for manufacturing a better class of cheese to the cheese makers, factory owners and patrons of cheese factories in New Brunswick. The New Brunswick cheese manufacturers fell into line and there was soon a decided improvement in quality, and an improved system of marketing was introduced. During these years Mr. Mitchell also helped very materially in establishing central creameries at Moncton and St. Hilaire, N.B."

No one knows the needs of the farmers of New Brunswick better than Mr. Mitchell. He is a farmer and the son of a farmer.

He knows every section of the province, and he comes to the department possessing the good will of every member of the staff.

Mr. J. H. Hoyt, who has been Assistant to the Director of Elementary Agricultural Education, Sussex, has been transferred to the staff of District Agricultural Representatives, with headquarters at Bathurst, Gloucester county, N.B.

MACDONALD COLLEGE

The Biology department, Macdonald College, has been divided into two:—the department of Entomology and Zoology, under Professor William Lochhead, and the department of Botany, under Professor B. T. Dickson.

Dr. G. P. McRostie has been appointed Assistant Professor in the Cereal Husbandry department of Macdonald College, in charge of grass and clover investigations. Dr. McRostie graduated from the Ontario Agricultural College in 1912, and after serving with the Ontario Department of Agriculture as agricultural representative for a time, took up post graduate work at Cornell University, from which he received the degree of Doctor of Philosophy in 1919. At Cornell he majored in Plant Breeding and Plant Pathology, and did special work in breeding beans for disease resistance.

Mr. Walter Biffen, B.Sc., N.D.D., has been appointed lecturer in the department of Botany. Mr. Biffen graduated from the University of Wales in 1906 with B.Sc.,

in agriculture, and the following year completed the N.D.D. at Midland College. For three years he was research assistant in the Imperial Department of Agriculture for the West Indies. Later he taught at Aberystwyth University and Tamworth Agricultural College. He will teach part of the courses in Botany and will also engage in research work.

Miss Anita E. Hill, Head of the School of Household Science since 1917, and a member of the staff for several years previous to that, resigned her position some months ago. Miss Bessie M. Philp, Instructor of the Household Science staff since 1914, has been appointed to succeed Miss Hill.

Miss M. M. Chute, who, since August 1919, had been in charge of the Extension Work of the School of Household Science, gave up this position in September, 1920, to accept an instructorship on the staff of the School. Miss Chute's post as Superintendent of Women's Institutes of Quebec was taken over in January, 1921, by Miss Della E. Saunders of Florenceville, N.B. Miss Saunders is a graduate in Household Science of Acadia Ladies' Seminary and for some years has been connected with Women's Institute work in P.E.I., being Superintendent for the past two years.

Miss Eleanor B. Ament of Rochester, N.Y., was appointed in October, 1920, to take charge of the Dressmaking Department in the School of Household Science. Miss Ament is a graduate of Mechanics Institute Rochester, N.Y., and since completing her course, taught in McKeesport, Pa.

MEETINGS OF ASSOCIATIONS, 1921

March 2. The Annual Meeting of the Royal Agricultural Winter Fair Association of Canada. Toronto. C. F. Bailey, Toronto, is Managing Director.

March 2-3. Alberta Provincial Horse Cattle, Sheep and Swine Breeders' Associations. W. J. Stark Secretary, Edmonton.

March 8-10. Regina Cattle Sale.

March 16-17. Manitoba Winter Fair, Brandon.

March 18. Manitoba Association Cattle Sale, Brandon.

March 23. Canadian Ayrshire Breeders' Annual meeting, Montreal.

April 4-9. Alberta Spring Horse Show at Calgary. E. L. Richardson, Secretary.

April 5-8. Alberta Cattle Breeders' Association at Calgary. Annual auction sale and show of pure bred bulls; beef breeds. E. L. Richardson, Secretary, Calgary, Alta.

April 6. National Dairy Council, Toronto. Secretary, D'Arcy Scott, Ottawa.

April 11-16. Alberta Spring Show—Boys' and Girls' Competition, Edmonton.

May 25-27. Alberta Cattle Breeders' Association at Calgary. Annual auction sale and show of pure bred cattle; beef Breeds. E. L. Richardson, Secretary.

ASSOCIATIONS AND SOCIETIES

WESTERN CANADIAN SOCIETY OF AGRONOMY

The Western Canadian Society of Agronomy met at the University of Alberta, Edmonton, on December 28, 29 and 30, 1920, for its first regular annual meeting.

The object of the Society is the encouragement of investigational work in crops and soils and to disseminate knowledge concerning both; to secure the highest standard of instruction in agronomy at all agricultural educational institutions in the prairie provinces; to unify and standardize as much as possible the methods used by the different investigators throughout the Middle West in Canada.

The Department of Agriculture of Alberta has consented to publish the papers delivered at the conference in bulletin form for distribution among the members of the Association, while those of special interest to farmers will be published in a separate bulletin for free distribution.

The executive elected to carry on the work of the organization through the year 1921 are as follows:—

President: Prof. T. J. Harrison, Manitoba Agricultural College; Vice-President, Prof. G. H. Cutler, University of Alberta; Secretary-Treasurer, Prof. R. Sansen, University of Saskatchewan; F. S. Grisdale, Principal Olds Agricultural School; W. C. McKillican, Superintendent Experimental Farm, Brandon, Man.

The following resolutions were adopted:—

1. Resolved that it is the unanimous opinion of the members of the Western Canadian Society of Agronomy that one of the most urgent needs in agriculture of the prairie provinces is the inauguration of a complete soil survey.

2. Resolved that in order that undue duplication of effort be avoided, and that the highest standard of work be achieved, that the members of the W.C.S.A. strongly urge more and more co-operation among the agronomists in the three prairie provinces in solving problems of common interest.

3. Resolved that whereas seeding down to grass is a recognized means of reclamation and prevention of soil drifting, and that whereas the more acute the problem, the more difficult it is to get grass crops to grow, and whereas there has not been sufficient experimental work done to solve the problem, be it resolved that the W.C.S.A.

recommend that the question of method of seeding down to grasses in drifting areas, be thoroughly investigated by further experimentation.

4. Resolved that we emphasize the importance of post-graduate work as a training for research in agriculture.

5. Resolved that as the meteorological data available in the three prairie provinces is too meagre to give the information required, the W.C.S.A. recommends that the equipment at the existing meteorological stations be increased and that new stations be located in representative areas at present unserved, and that special attention be given to evaporation, wind velocity, and barometric pressure, as well as temperature, rainfall and sunshine.

DOMINION SHORTHORN BREEDERS' ASSOCIATION

Among the resolutions passed by the Shorthorn Breeders at their annual meeting was one endorsing the campaigns now being waged against the scrub bull. The following officers were elected: President, J. G. Barron, Carberry, Man.; Vice-President, H. M. Pettit, Freeman, Ont.; Second Vice-President, Hon. Duncan Marshall, Olds, Alta.; Secretary, Professor G. E. Day.

THE CANADIAN HOLSTEIN BREEDERS' ASSOCIATION

At its annual meeting the above Association elected the following officers for the ensuing year: President, F. R. Mallory, Frankford, Ont.; 1st Vice-President, A. E. Hulet, Norwich; 2nd Vice-President, R. W. E. Burnaby, Jefferson, Ont.; 3rd Vice-President, P. J. Salley, Lachine Rapids, Que.; 4th Vice-President, Hon. Walter M. Lea, Charlottetown, P.E.I.

CANADIAN GUERNSEY BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Guernsey Breeders' Association held at Amherst, N.S., the following were elected officers for 1921:—President: Capt. Hugh Dickson, Truro, N.S.; 1st Vice-President: Jas. F. Roper, Charlottetown, P.E.I.; 2nd Vice-President, R. Eric Fisher, Bolton Centre, Quebec; Secretary-Treasurer, H. W. Corning, M.P.P., Yarmouth, N.S.

CANADIAN CO-OPERATIVE WOOL GROWERS' ASSOCIATION

The following are the officers and directors for 1921: President, Col. Robt. McEwan, London, Ont.; 1st Vice-President, J. W. Renton, Calgary, Alta.; 2nd Vice-President, S. A. Logan, Amherst, N.S.; Directors, British Columbia, G. C. Gay; Alberta, Levi Harker; Saskatchewan, J. C. Beatty and G. N. Buffum; Manitoba, W. C. McKillican and Geo. Gordon; Ontario, W. A. Dryden and G. L. Telfer; Quebec, J. A. McClary and George Bouchard; New Brunswick, W. E. Wallace; Prince Edward Island, W. McGregor.

CANADIAN SHEEP BREEDERS' ASSOCIATION

The following were elected officers and directors of the Canadian Sheep Breeders' Association for the year 1921: President, W. A. Dryden, Brooklin; Vice-President, H. F. Follett, Duval, Sask.; Maritime Provinces, R. B. Bishop, 85 Germain St., St. John, N.B.; Quebec, James Bryson, Brysonville; Victor Sylvestre, St. Hyacinthe; Arsene Denis, St. Norbert Station; Ontario, W. A. Dryden, Brooklin; Lt.-Col. R. McEwen, London; Geo. Telfer, Paris, and R. H. Harding, Thorndale; Manitoba, George Gordon, Oak Lake, Man.; Saskatchewan, F. H. Follett, Duval, Sask., Alberta, R. Knight, R.R. No. 1, Calgary, Alta.; British Columbia, S. F. Tolmie, Victoria, B.C.; Secretary, R. W. Wade, Department of Agriculture, Toronto, Ont.

CANADIAN SWINE BREEDERS' ASSOCIATION

The following directors have been elected for the Canadian Swine Breeders' Association for 1921. The director for Ontario will be elected later.

Alberta, W. J. Hoover, Bittern Lake; Saskatchewan, Philip Leech, Baring; Manitoba, W. H. English, Harding; British Columbia, Albert C. Marshall, South Westminster; Maritime Provinces, J. F. Roach, Sussex, N.B.; Quebec, M. Ste. Marie, Compton, Que.

THE CLYDESDALE HORSE ASSOCIATION OF CANADA

At the annual meeting of the Association, the President, Mr. James Torrance, called attention to the steady decrease in the horse population in this country and the United States, only the Province of Prince Edward Island showing any addition in the past year. In his opinion a keen shortage, almost a famine, of good heavy animals would be experienced before long, and he strongly advocated the breeding of every good mare of size in the country.

The following are the officers for the coming year:—President: James Torrance, Markham, Ont.; Vice-President: Dr. T. H. Hassard, Markham; Secretary-Treasurer: J. W. Wheaton, Toronto.

THE CANADIAN HACKNEY HORSE SOCIETY

The Canadian Hackney Horse Society at the annual meeting in Toronto, elected the following officers for 1921:—Hon.-President: Robert Graham, Toronto; President: Dr. J. W. R. Fowler, Toronto; Vice-President: H. A. M. Manson, Agincourt; Secretary: J. E. Rettie, Toronto.

THE CANADIAN SHIRE HORSE ASSOCIATION

The officers of the above association for 1921 are as follows:—President: T. D. Morden, Oakville, Ont.; Vice-President: W. J. Gardhouse, Highfield, Ont.; Secretary-Treasurer, G. D. Green, Toronto.

CANADIAN STANDARD BRED HORSE SOCIETY

The following are the officers for 1921:—Honorary President: Sam McBride, Toronto; President: F. S. Scott, M.P., Galt; Secretary-Treasurer: John W. Brant, Ottawa.

THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO

The convention and dairy exhibition of the Dairymen's Association of Western Ontario was held at London on January 12 and 13, 1921. The convention was well attended throughout and a fine exhibition of dairy products was a prominent feature.

Resolutions were passed tendering the thanks of the Association to the Dominion and Provincial Departments of Agriculture for assistance rendered the dairy industry, particularly in connection with the Butter Scoring Contest, the educational campaign, pure bred dairy sires, the Cow Testing Campaign, and also for the Market Letters sent out by the Dairy Branch of the Federal Department.

The following are the officers for 1921:—President: J. Scott, Woodstock, Ont.; 1st Vice-President: J. N. Allen, Dunnville, Ont.; 2nd Vice-President: R. Johnston, Bright, Ont.; 3rd Vice-President: H. Mannel, Woodstock, Ont.; Secretary-Treasurer, Frank Herns, London, Ont.

EASTERN ONTARIO DAIRYMEN'S ASSOCIATION

The following were among the resolutions adopted at the recent convention of the Eastern Dairymen's Association:—

That the Dairy Standards Act be immediately placed on the Statute Books; that the

Federal Government grade all cheese manufactured for export; The officers elected for 1921 are:—President: George Smyth, Iroquois; First Vice-President: M. N. Empey, Napanee; Second Vice-President: R. W. Ireland, Wellington; Secretary: (permanent) T. A. Thompson.

THE ONTARIO MILK AND CREAM PRODUCERS' ASSOCIATION

The Ontario Milk and Cream Producers' Association held its annual convention in Toronto on February 1, when the decision was arrived at to organize for the inclusion of all the 100,000 milk producers of the Province. Mr. E. H. Stonehouse of Weston is President; Secretary: J. P. Griffin, Toronto.

ONTARIO FAIRS ASSOCIATION

At the annual meeting of the Ontario Association of Fairs and Exhibitions the following officers were elected for the coming year:—President: W. J. Connelly, Cobden; First Vice-President: John Farrell, Forest; Secretary: J. Lockie Wilson, Toronto.

ONTARIO HORTICULTURAL SOCIETY

The fifteenth annual convention of the above society, held recently in Toronto, recommended government inspection of all imported bulbs and the examination of all domestic bulbs offered for sale.

The officers of the association for the ensuing year are:—President: Miss Mary Yates, Port Credit; First Vice-President: Rev. Wm. McKay, Weston; Second Vice-President J. P. Jaffray, Galt; Secretary and Editor: J. Lockie Wilson, Toronto.

THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

At the annual meeting of the above society held in December last, a resolution was adopted recommending an extension of the area of land devoted to the breeding and testing of hardy fruits at the Central Experimental Farm.

The following are the officers for 1921:—Hon. President: Z. A. Raymond, Montreal; Hon. Vice-President: C. E. Petch, Hemmingford; President: J. H. Lavoie, Quebec City; Vice-President, J. R. Marshall, Abbotsford; Sec.-Treasurer: Peter Reid, Chateau Basin.

MARITIME STOCK BREEDERS' ASSOCIATION

The annual meeting of the above Association elected the following officers for 1921:—President, A. E. Trites; Vice-President

for Nova Scotia, S. A. Logan; Vice-President for New Brunswick, A. Mcq. Avard; Vice-President, for Prince Edward Island, J. M. Laird.

NOVA SCOTIA POULTRY ASSOCIATION

The annual meeting of the Nova Scotia Poultry Association took place at the Agricultural College, Truro, on January 13. The decision was reached not to increase the number of birds in the Egg Laying Contest pens, and the Association will, therefore, forego for the present the registration of their birds in the Canadian Record of Performance. Last year some 1,500 day-old chicks were successfully imported from hatcheries for the use of members. The following officers were elected: President, W. W. Ausborne, New Glasgow; Vice-President: Edison Griffin, Port Williams; Secretary-Treasurer, J. P. Landry, Truro.

DAIRYMEN'S ASSOCIATION OF NOVA SCOTIA

At the annual convention of the above Association, held at Bridgewater on January 19 and 20, 1921, the following was among the resolutions passed:—

That the Summer Butter Scoring Competition, having served its purpose, be discontinued and that a contest of a purely educational and experimental nature, without money prizes, be substituted.

The officers elected for the coming year were: President, R. B. McLennan; Vice-President: F. A. Illsley; Secretary-Treasurer, W. A. MacKay.

THE NOVA SCOTIA FARMERS' ASSOCIATION

At the annual meeting of the Nova Scotia Farmers' Association held at Bridgetown in January last, among the resolutions passed were the following:—

That the Department of Agriculture make a survey of the agricultural conditions in the province, including information as to cost of production; that the Federal Government be urged to secure for the province immigrants with farming experience and capital; also farm and domestic help; that the Provincial Government be asked to establish a maritime dairy school; that the provincial exhibition be established at Halifax or some central point in the province.

The secretary of the Association is Chas. R. B. Bryan, Truro.

EASTERN CANADA VETERINARY ASSOCIATION

At the annual meeting of the Eastern Canada Veterinary Association held at Ottawa in January, Dr. George Hilton, Ottawa, was re-elected President, The

Honourable S. F. Tolmie, Minister of Agriculture, was elected Honorary Patron of the Association.

THE SASKATCHEWAN CATTLE BREEDERS ASSOCIATION

The annual meeting of the Saskatchewan Cattle Breeders at Moosejaw established a record in point of attendance. The Hon. C. M. Hamilton, Minister of Agriculture, made the announcement that Saskatchewan was to have a "Better bull campaign." Each of the western provinces has been ripe for a move of this kind ever since the armistice, as a closer margin of profit calls for a better quality of cattle. Mr. Hamilton called for a greater degree of community effort in pure-bred livestock breeding. He instanced a section of the province where Shorthorns were at present exclusively raised and showed the benefits arising out of a continuation of that policy. There were, he said, other sections of the province better suited to other breeds, and in these cases likewise the effort should be concentrated upon the one kind of cattle.

Dr. Barker, of the Dominion Health of Animals Branch, read a paper on the accredited herd system, which led to the action taken regarding testing of animals sold at the provincial sales; all those sold after March must be sold subject to a 60-day retest.

A resolution was passed asking for the establishment of a veterinary research laboratory at the Indian Head Experimental Farm.

SASKATCHEWAN LIVE STOCK CONVENTION

The following were the officers elected for 1921 at the convention of the under-mentioned associations held at Moosejaw in January last—

Horse Breeders' Association.—President, Swanton Haggerty, Belle Plain; Vice-President, George Rupp, Lampman.

Cattle Breeders' Association.—President: James Browne, Newdorf; Vice-President, R. W. Wright, Drinkwater.

Sheep Breeders' Association.—Hon. President, A. J. Quigley, Sintaluta; President H. H. Follet, Duval; Vice-President, J. N. Buffum, Bechard.

Swine Breeders' Association.—President, S. V. Tomecko, Lipton; Vice-President, C. W. Thurston, Regina.

The secretary of the above Association is J. G. Robertson, Regina.

CENTRAL ALBERTA CATTLE BREEDERS

An association known as the Central Alberta Cattle Breeders' Association was formed at Lacombe, Alberta, for the purpose of conducting an annual sale of pure bred stock. About sixty leading stockmen were present. Secretary, John McKenty, Lacombe, Alta.

THE GOAT BREEDERS OF BRITISH COLUMBIA ORGANIZE

The British Columbia Goat Breeders' Association held its annual meeting in Vancouver in January. Goat breeding is an expanding industry in the province, and the membership shows an increase over the previous year of nearly one hundred. Breeders elsewhere in Canada are looking to British Columbia for their stock and the members are striving to maintain their herds at a high level of quality. A number of shows were held during 1920 at which a healthy rivalry was indicated. Increasing recognition of the value of goat's milk for the feeding of children, particularly in cases of malnutrition, is noted. The medical profession is recommending its use more and more, with gratifying results.

The officers elected for 1921 were:—President: W. H. Cottrell, Vancouver; Vice-President: C. H. Unwin, Victoria; Secretary, George Palmer, Department of Agriculture, Victoria.

THE LIBRARY

List of recent and more important additions to the Library of the Department of Agriculture, International Institute Branch, Ottawa.

An Introduction to Bacterial Diseases of Plants, by Erwin F. Smith, Philadelphia, W. B. Saunders Co., 1920.

Weeds of Farm Land, by Winnifred E. Brenchley, D.Sc., F.L.S., Fellow of University College, London, Botanist, Rothamsted Experimental Station. London, Longmans, Green & Co., 1920.

Physiology of Farm Animals, by T. B. Wood, M.A., F.R.S., and F. H. A. Marshall, Sc.D. Part I, General, by F. H. A. Marshall, Sc.D., Fellow of Christ's College, Cambridge, and Reader in agricultural physiology. Cambridge, University press, 1920.

Some Recent Researches in Plant Physiology, by W. R. G. Atkins, M.A., Sc.D. (Dubl.) F. I. C., Assistant to the University Professor of Botany, Trinity College, Dublin. London and New York, Whittaker, 1916.

A Course of Practical Chemistry for Agricultural Students, by L. F. Newman, M.A., F.I.C., Fellow of St. Catharine's College, Cambridge, and H. A. D. Neville, M.A., B.Sc., F.I.C. Professor of agricultural chemistry, University College, Reading. Cambridge, University press, 1920.

Botany with Agricultural Application, by John N. Martin, Ph. D., Professor of botany at the Iowa State College of Agricultural and Mechanic Arts, 2d edition revised. New York, John Wiley & Sons, inc. 1920.

Les Industries de L'Alimentation, by Paul Petit, Professeur a la Faculte des sciences de Nancy. Paris, Payot & Cie, 1919.

Chemical Fertilizers and Parasitocides, by S. Hoare Collins, M.Sc., F.I.C., Lecturer and adviser in agricultural chemistry. Armstrong College, New York, D. Van Nostrand Co., 1920.

The Elements of Marketing, by P. T. Cherington, formerly Professor of Marketing in the Graduate School of Business Administration, Harvard University. Toronto, Macmillan Co. of Canada, 1920.

The Encyclopedia of the Stable, by Vero Shaw, Editor of "The Horse World". New York, E. P. Dutton & Co., 1909.

The Laws of Hybridizing, discovered by Richard Diener, Kentfield, Calif., published by the author, c1920.

Biology for High Schools, by W. M. Smallwood, Syracuse University, Ida L. Reveley, Wells College, and Guy A. Bailey, Genesee State Normal School. Boston, Allyn & Bacon, 1920.

Food and the Public Health, by William G. Savage, B.Sc., M.D., London, D.P.H. County Medical Officer of Health, Somerset. Toronto, Cassell & Co., Ltd., 1919.

Travelling Publicity Campaigns, by Mary Swain Routzahn. New York, Russell Sage Foundation, c 1920.

Pasture Studies: Some Results, by T. J. Jenkin, D.Sc., Adviser in agricultural botany, University College of North Wales, Bangor, Jarvis & Foster, 1919.

Design and Construction in Wood, by William Noyes, Assistant Professor of Industrial Arts, Teachers' College, Columbia University. Peoria, Manual arts press, 1919.

The Mechanism of Mendelian Heredity, by T. H. Morgan, Professor of experimental zoology, Columbia University, A. H. Sturtevant, H. J. Muller, and C. B. Bridges, all of Columbia University. New York, Henry Holt & Co., c1915.

Les Abeilles et le Miel, par J. Gaget, Professeur d'agriculture, Paris, Librairie Hachette, c1920.

The Bee Keeper's Vade Mecum, by Henry Geary. London, Stanley Paul & Co., c1920.

The Price of Milk, by Clyde L. King, Ph. D. Wharton School of Commerce and Finance, University of Pennsylvania. Philadelphia, John C. Winston Co., c1920.

Household Physics, by Alfred M. Butler, A.M. Head of Science Department, High School of Practical Arts, Boston. Boston, Whitcomb & Barrows, 1919.

Le Lait, Physiologie, Analyse, Utilization, by A. Monvoisin, Chef des Travaux de Physique et de Chimie. Ecole veterinaire d'Alfort, 2d edition. Paris, Asselin & Houzeau, 1920.

Official and Tentative Methods of Analysis as compiled by the Committee on revision of methods of the Association of official agricultural chemists, revised to November 1, 1919. Washington, D.C., 1920.

Margarine, by William Clayton, M.Sc., (Liverpool), Member of the British Association Committee of "Colloid Chemistry and its general and industrial application."

Milk and its Hygienic Relations, by Janet E. Lane-Claypon, M.D., D.Sc., (Lond.) Assistant Medical Inspector under the Local Government Board. London, Longmans, Green & Co., 1916.

Agricultural Bacteriology, Theoretical and Practical, by John Percival, M.A., F.L.S., Professor of agricultural botany, University College, Reading, 2d edition. London, Duckworth & Co., 1920.

Physical Basis of Heredity, by Thomas Hunt Morgan, Professor of Experimental Zoology, Columbia University. Philadelphia and Montreal, J. D. Lippincott Co., 1919.

Life and Work of Sir Jagadis Chunder Bose, M.A., D.Sc. LL.D., F.R.S., C.I.E., C.S.I., Director of the Bose Research Institute. Calcutta, by Patrick Geddes, Professor of Sociology and Civics, University of Bombay. New York, Longmans, Green & Co., 1920.

The Chemistry of Crop Production, by T. B. Wood, C.B.E., M.A., F.I.C., F.R.S., Professor of agriculture, University of Cambridge. London, University tutorial press, Ltd., 1920.

The Microbiology and Microanalysis of Foods, by Albert Schneider, M.D., Ph.D., Professor of Pharmacognosy, University of Nebraska. Philadelphia, P. Blakiston's Son & Co., c1920.

Nature Study and Agriculture, by Charles C. Schmidt, M.S., Professor of education in the University of North Dakota. Boston, D. C. Heath & Co., c1920.

Short Talks on Personal and Community Health, by Louis Lehrfeld, A.M., M.D., Agent for the prevention of disease, Dept. of Public Health, Philadelphia.

Gas -Engine Principles, by Roger B. Whitman, New York, D. Appleton & Co., 1920.

The Evolution of Sex in Plants, by John Merle Coulter, Head of the Department of Botany, University of Chicago. Chicago, University of Chicago press, 1916.

Farm and Garden Tractors, by A. Frederick Collins, Member of the Royal Aero Club of the United Kingdom. New York, F. A. Stokes Co. c1920. 279pp. illus. cloth, \$2.25.

Outlines of Dairy Bacteriology, by H. L. Russell, Dean of the College of Agriculture, University of Wisconsin, and E. G. Hastings, Professor of agricultural bacteriology, University of Wisconsin. 11th edition. Madison, published by the author, 1920.

Condensed Chemical Dictionary.—Compiled and edited by the Editorial staff of the Chemical Engineering Catalog. New York, Chemical Catalog Company, Inc. c1920.

The Pasteurization of Milk from the Practical Viewpoint, by Charles H. Kilbourne, late Chief of the Division of Pasteurizing Plants, New York City Dept. of Health. New York, John Wiley & Sons, inc., 1916.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

The Maple Sugar Industry in Canada, Pamphlet No. 8, Publications Branch.—This pamphlet, compiled by the Director of Publicity, Mr. J. B. Spencer, replaces "Bulletin No. 2B" published in 1913, which is revised and brought up to date to indicate the progress of the maple sugar and syrup industry in Canada. The pamphlet is well illustrated, and fully describes modern processes from the gathering of the sap to the marketing of the products. Statistics of production are given.

Report on the Agricultural Instruction Act, 1919-20.—This report reviews the various forms of work carried on during the year by the provinces, by means of the

grants made by the Dominion in aid of agricultural education and instruction.

Tick Paralysis in British Columbia.—Bulletin No. 28 of the Health of Animals Branch. Describe the Paralysis Tick and its effects. Coloured illustrations.

ONTARIO

Report of the Horticultural Societies of Ontario, 1919.—Issued by the Department of Agriculture, Toronto, Ont.

Dairymen's Association of the Province of Ontario, 1919.—Issued by the Ontario Department of Agriculture. This report deals with the work of the two associations, Eastern and Western, and also includes a

report on the Dairy Branch of the Ontario Agricultural College and on the Eastern Dairy School, Kingston.

■ *Report of Committee on Rural Credits, 1920.* This report contains information on the subject of rural credits compiled by the committee appointed to investigate the problem, together with recommendations as to the establishment of rural credit societies under Ontario conditions.

SASKATCHEWAN

The Fifteenth Annual Report of the Department of Agriculture of the Province of Saskatchewan for the year ended April 30, 1920. This report includes that of the Deputy Minister of Agriculture, Secretary of Statistics, the Chief Game Guardian, Bureau of Labour, and of the Heads of several branches of the Department proper.

Report of the Director of Agricultural Extension, 1920.—The report deals with the activities of the agricultural societies, including shows and exhibitions, ploughing matches, crop and other competitions, live stock sales, seed fairs, and short courses, during the period covered.

BRITISH COLUMBIA

Clearing Bush Lands.—Bulletin No. 85 of the Department of Agriculture of British Columbia. Third edition, revised to meet changing conditions with respect to land clearing in British Columbia.

MISCELLANEOUS

Scientific Agriculture.—This magazine, which is the official organ of the Canadian Society of Technical Agriculturists, published its first number in January, 1921. The magazine is issued in the interest of Agricultural Science and Research, and has for its object the general advancement of Agriculture in Canada. As the publicity medium of the organization, it proposes to deal with the educational, scientific, and more advanced

phases of agricultural effort, and will not overlap the sphere occupied by the agricultural press. There is obviously a place in this country for a magazine representing the technical and scientific aspects of agriculture, and the members of the Society will no doubt co-operate in making the undertaking a success.

Scientific Agriculture is issued monthly by the Garden City Press, Ste Anne de Bellevue, P.Q. The editor is Mr. Fred. H. Grindley.

School Agriculture and Club Leader.—This is a new monthly periodical, issued by direction of the Minister of Education for Saskatchewan to supersede *The Rural Education Monthly* and *The League News*. It will constitute the official publicity medium for Elementary Agricultural Education, School Exhibitions and Boys' and Girls' Clubs, under the supervision of the Director of School Agriculture, Department of Education, Regina.

Live Stock and Animal Products Statistics, 1909-1919.—Dominion Bureau of Statistics, Ottawa. This statistical report on the live stock and allied industries of Canada is the first of a proposed series, designed to present a general review of production and trade during the period of the war, with sufficient pre-war data to afford a basis for comparison.

The Canadian Jersey Cattle Club Record, volume IV, 1919.—Issued by The Office of the Canadian National Live Stock Records, Ottawa.

Canadian Aberdeen-Angus Recorder.—The official publication of the Canadian Aberdeen Angus Association, Brandon, Manitoba.

The Canadian Swine Breeders' Record, Volume 31, 1920, compiled by the Canadian National Live Stock Records, Ottawa, comprises the pedigrees recorded during the year of the various breeds of swine, index to animals and to breeders and owners' membership list, etc.

THE AGRICULTURAL PRESS

INDEX TO ARTICLES BY OFFICIALS OF DOMINION AND PROVINCIAL DEPARTMENTS OF AGRICULTURE.

The Canadian Countryman, Toronto, Ont.

January 15. *How Dairymen can Successfully Meet Lower Prices.* H. H. Dean, Professor of Field Husbandry, O. A. C., Guelph, page 3.

January 22. *Short Versus Long Keep Steers.* G. W. Muir, Central Experimental Farm, Ottawa, page 4.

February 5. *Official Grading and Control of Dairy Produce for Export.* J. A. Ruddick, Dairy Commissioner, Ottawa, page 4.

February 12. *Official Grading and Control of Dairy Produce for Export* (concluded). J. A. Ruddick, Dairy Commissioner, Ottawa, page 6.

February 19. *Paying for Milk According to Butter-fat Content.* Prof. H. H. Dean, page 3.

January 29. *How to Lower the Cost of Milk Production.* E. S. Archibald, Director, Experimental Farms System, page 3.

The Canadian Farmer, Toronto, Ont.

January 29. *The Agglutination Test for Contagious Abortion in Cattle.* Prof. H. Jones, Department of Bacteriology, O. A. C., Guelph, page 4.

The Farmer's Advocate, Winnipeg, Man.

January 5. *Gaitre and Hairlessness in Sheep, Swine, Cattle and Horses.* G. S. Freeborn, Sheep and Goat Division, Dominion Department of Agriculture, page 9.

Some Biological Problems in Agriculture. Prof. V. W. Jackson, M.A., page 12.

Dairying the World Over. J. A. Ruddick, Dairy and Cold Storage Commissioner, Department of Agriculture, Ottawa, page 7.

February 10. *Co-operative Marketing of Live Stock from the Maritime Provinces.* W. R. Reek, Assistant Commissioner, Live Stock Branch, Ottawa, page 191.

Farm and Dairy, Toronto, Ont.

January 6. *Official Grading and Control of Dairy Produce.* J. A. Ruddick, Dominion Dairy Commissioner, page 1.

February 17. *The Live Stock Industry.* Geo. E. Day, Secretary, Canadian Shorthorn Breeders' Association.

January 20. *Lowering the Cost of Milk Production.* E. S. Archibald, Director Dominion Experimental Farms System, page 7.

The Agricultural Journal, Victoria, B. C.

February 7. *Vanished and Vanishing Birds.* P. A. Taverner, Ornithologist to the Geological Survey, page 346.

January 27. *Prevention of Calving Troubles.* Geo. W. Muir, Central Experimental Farm, Ottawa, page 7.

Native Industries—Such as Factory Dairying. J. B. Reynolds, President, O. A. C. Guelph, page 3.

February 3. *Future Prospects of the Dairy Industry.* H. H. Dean, O. A. C., page 5.

Farm and Home, Vancouver, B. C.

January 20. *Time has Arrived for Re-establishing the Swine Industry in Western Canada.* A. A. MacMillan, Chief, Sheep and Goat Division, Live Stock Branch, Ottawa, page 4.

February 3. *The Danger of the Codling Moth to the Fruit Industry.* Dean F. M. Clement, University of British Columbia, page 5.

Farmer's Magazine, Toronto, Ont.

January 1. *Where the Urban Crowds the Rural.* President J. B. Reynolds, O.A.C., Guelph, page 11.

February 17. *Economic Feeding of Dairy Cows.* E. S. Archibald, B.A., B.S.A., Director of Central Experimental Farm, Ottawa.

The Grain Growers' Guide, Winnipeg, Man.

January 5. *Co-operative Activities in Sask.*, J. F. Booth, B.S.A., Co-operation and Markets Commissioner, page 9.

Journal of Agriculture and Horticulture, Quebec, Que.

February 1. *Are We Doing Our Best for Our Boys and Girls.* J. Harold McOuatt, Demonstrator to Rural Schools, Macdonald College, Que., page 137.

Bush and Cane Fruits Suitable for Quebec. T. G. Bunting, B.S.A., Prof. of Horticulture, Macdonald College, Que., page 148.

Why not More Hogs? A. A. MacMillan, Chief, Sheep and Goat Division, Ottawa, page 143.

The Nor' West Farmer, Winnipeg, Man.

January 5. *Crop Rotations for Prairie Farms.* E. S. Hopkins, M.S., B.S.A., page 5.

The Saskatchewan Farmer, Moose Jaw, Sask.

January 3. *Canadian Live Stock Industry, Retrospect of Past Few Years and Outlook for the Future.* Hon. Dr. Tolmie, Dominion Minister of Agriculture, page 15.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

GENERAL INFORMATION

- 4.—Action of Ultra-Violet Rays on Vitamines.—ZILVA, S. S., in *Biochemical Journal* Vol. XIII, No. 2, pp. 164-171. Cambridge, July, 1919.

The fat-soluble A. factor in butter fat is destroyed by an 8 hours' exposure to ultra-violet rays; at the same time the butter is bleached and becomes unfit for consumption. The author therefore asks whether the sterilization of milk by the ultra-violet rays can decrease its nutritive value.

The antineuritic and antiscorbutic vitamins are not destroyed by ultra-violet rays; in fact, the author has reported that the exposure of neutralized lemon juice for 8 hours to ultra-violet rays did not influence its antiscorbutic activity, and that a similar exposure of autolysed yeast juice did not impair its antineuritic power.

CROPS AND CULTIVATION

- 1082.—Protection Against Hail.—LABERGIERE, in *Revue de Viticulture*, Year XXVI, Vol. LI, No. 1308, pp. 53-57, Paris, July 24, 1919.

In this article, the author gives a summary of facts relating to the storms that have occurred during the last few years in different parts of the country, and the damage they have caused. He treats successively of the effect of hail-rods (*niagaras electriques*), and anti-hail cannons, bombs and rockets. He concludes from the results of the experiments carried out that there is no practical manner of controlling hail, and states that the great expense which has been incurred in the attempt to devise apparatus for this purpose, has produced no adequate results; hence, all further efforts in this direction are useless.

- 10.—Effect of Weather Conditions on the Setting of Fruit in the Plum in Minnesota, U.S.A.—DORSEY, M. J., in *Journal of Agricultural Research*, Vol. XVII, No. 3, pp. 103-126. Washington, June, 1919.

Results of a series of parallel meteorological and biological observations made with

the object of determining in what manner and to what extent, weather influences the setting of fruit in the plum.

The author made these observations at the Fruit Breeding Section of the Agricultural Experiment Station of the University of Minnesota, on different species of *Prunes*, during the period 1915-17. The most important weather conditions which affect the setting of fruit are certainly rain and low temperature, which act in a clearly negative manner and may cause a failure of the crop even when the trees have flowered abundantly.

However, to understand correctly how rainfall and temperature affect the setting of fruit, it is necessary to investigate this phenomenon briefly from an anatomic and physiological point of view.

The period during which the stigma of the plum remains receptive is, at most, one week; pollination must therefore be effected during this relatively short period to enable fertilization to take place. All conditions which delay pollination cannot therefore but have a negative influence on the formation of fruit. Further, besides the degree of receptivity of the stigma, there is another phenomenon which helps to still further limit the time during which fertilization is practicable; this is the detaching of a part of the pistil which takes place from 8 to 15 days after flowering. And, before the actual abscission of the style is effected, the layer or diaphragm of the modified and thickened cells of the absciss layer constitutes an obstacle to the lengthening of the pollen tube towards the ovary. All phenomena which hinder or slow down the growth of the pollen tube can therefore also influence the setting of fruit in a negative sense.

Now, continuous rain at the flowering season hinders pollination considerably and if prolonged may absolutely prevent it.

In an atmosphere saturated with humidity, the anthers, even if ripe cannot open, and if they are already open, they bend over at once when it commences to rain. Rainy weather during the period when the stigmas are receptive is itself sufficient to prevent the setting of fruit. Similar results have been

obtained artificially by continuous spraying of trees in flower with water.

The growth of the pollen-tube is in close relation with the temperature. The time required for penetration of the whole length of the style at a temperature of 55° to 60° F. is about 6 days for the variety "Surprise". The rate of growth of the pollen-tube decreases proportionally with the lowering of the temperature and, according to Goff, at 40° (4° F.C.) pollen ceases to germinate.

On the other hand low temperature does not appear to exercise any influence on the date of abscission of the style; however, it is easily understood that a cold spring at the time of flowering may hinder the setting of fruit by retarding the growth of the pollen-tube up to the moment when the layer of disintegrated cells on the plane of abscission prevents the pollen-tube from growing toward the ovary.

13.—On the Agricultural Properties of Soils; Research on the Reaction of Soils.

RABATE, E., note by M. Schribaux, in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. V, No. 35, pp. 846-848 and 854-858, Paris, Oct. 29, 1919.

In order to judge the agricultural properties of soils and water and especially their chemical and physiological properties, among other tests, it is indispensable to know whether they have an alkaline or an acid reaction. To quote only a few established facts: Acid waters are bad for irrigation; in acid soils advantageous and immediate results may be expected with calcareous fertilizers (marl, lime, composts) and with alkaline manures (dung, liquid manure, slag, ashes). These almost always require phosphatic manures, and natural phosphates, finely ground, give good results. But bulletins of soil analyses issued by agricultural stations are usually silent on the subject of reaction of soils.

The author describes a new method which he has tested in various geological formations. He proposes to have recourse to logwood dye. This colouring matter has been studied by Chevreul, who extracted haematoxylin from it. The wood decoction turns yellow with dilute acids and red with concentrated acids; it is decolorized by sulphuretted hydrogen and turns violet with alkalis and alkaline salts; lime gives a blue precipitate.

The method of working is as follows:—20 cc. of distilled water or rainwater poured into a clear glass tube and 20 drops of the reagent are added; 5 gm. of fine earth, dried and sifted, are then mixed in the solution and left for 15-20 minutes.

Alkaline soils colour the water mauve or violet even when the alkalinity is very slight;

calcareous soils that lead to chlorosis give a more intense reaction. With acid soils the water becomes pale yellow, loses colour, or becomes leaden tinted. Neutral soils do not alter the original colour; they are very rare.

This is a simple and rapid method which, according to the author, is extremely sensitive.

1091.—The Lasting Benefits of Soil Blasting.

—*Scientific American*, Vol. CXIX, No. 13, pp. 253, New York, September 28, 1918.

Back among the hills of Georgia an interesting experiment in sub-soil blasting has been in progress for the past four years. The soil in this district is of a rich upland grade, and the sub-soil is red and very hard. In 1914, two acres were measured off. One was left for a check acre, the other was subsoiled with dynamite. Charges were exploded with blasting cap and fuse every 15 feet, 30 inches deep. This thoroughly shattered the hard, red clay, making cobweb fissures in all directions and thus permitting more water to enter than had before been possible. The roots also benefited by the breaking up of the subsoil, new avenues being opened up for them to go out in search of plant food.

Both acres were planted with cotton in 1914. Both received the same cultivation and care, though the subsoiled one got a little more fertilizer than the other. The difference in this respect was not nearly enough, however, to account for the discrepancy between the yield of 1,804 pounds of seed cotton for the blasted acre and 912 pounds for the unblasted plot.

Maize followed in 1915. This year both plots received identical treatment and fertilization. They were both kept well worked and clean. The yield of maize in the husk was 2,614 pounds for the blasted acre, 1,849 pounds for the other. Owing to the wet weather, it was impossible to weigh the fodder; there were, however, 225 bundles on the blasted acre against 115 bundles on the check acre.

In 1916, the plots were under cotton again, and the benefits of the blasting were more pronounced than ever. From the very start of the growing season, the cotton on the subsoiled acre outgrew the other, and by midsummer it was at least twice as high. It also fruited much better than that on the unblasted land, and when the yield was measured it was found to be exactly twice as productive: 2,000 pounds against 1,000.

In 1917, maize was once more planted on the two test acres. The blasted acre yielded 42½ bushels of maize and three full loads of fodder; the unblasted acre, 35 bushels and barely 2½ loads of fodder. The obvious conclusion was, therefore, that the blasting

had been a profitable investment. The increased yields soon took up the initial cost, leaving all subsequent crop increases as net profit. This is good farming as well as good business.

1115.—Intra-Organic Injections for the Purpose of Increasing the Yield of Plants: Experiments in Mexico and Cuba.—CALVINO, M., in *Revista de Agricultura, Comercio y Trabajo*, Year 2, Vol. II, No. 6, pp. 287-291. Havana, June, 1919.

Although the Russian botanists were the first to study the effect of injections upon plants, the credit of applying this treatment to a definite agricultural purpose belongs to Prof. Petit, of Mexico. When the writer was Director of the Central Agricultural Station of Mexico, he carried out, in 1912, a series of experiments with a view to determining the practical value of these injections. An old pear tree, which was covered with blossom every year, but never bore fruit, was subjected to the following treatment: at a little distance above the level of the ground, a hole extending as far as the fibro-vascular bundles was bored in the trunk. Into this hole was inserted a small glass tube communicating by means of rubber-tubing with a vessel (placed 1.5 m. above the ground) containing a nutrient solution composed of water 18 litres + sulphate of iron 19 gm. + nitrate of sodium 10 gm. The tree absorbed the solution in about 3 days. The following month, the leaves were larger and brighter in colour than those of the control trees (two old pear trees which, like the first one, flowered freely, but produced no fruit), numerous fruits set and developed well, whereas the control trees bore no pears.

In 1913, the writer made another experiment on a sterile pear tree. He used the following solution: water 20 litres + superphosphate 5 gm. + sulphate of potassium 5 gm. + nitrate of sodium 5 gm. + sulphate of iron 5 gm. The pear tree absorbed more than 50 litres of this solution just before the moment of flowering. It was well-covered with blossom and bore fruit. A lilac grafted on a privet was treated in the same manner, and produced a larger number of finer flowers.

The writer continued his work at the Agricultural Station of Santiago de la Vegas, where he experimented upon caryas.

This operation method opens up new fields of work: the injection of virus into plants suffering from bacterial diseases; the injection of vegetable substances (camphor, etc.) to induce vigorous growth: the injection of a solution of the product for which the plant is cultivated (for instance sugar in the case of the sugar-cane), in order to induce the "habit of the substance", and thus obtain more productive varieties, etc.

Injury to Seed Wheat Resulting from Drying After Disinfection with Formaldehyde.—HURD, ANNIE M., in *Journal of Agricultural Research*, Vol. XX, No. 3, pp. 209-224. Washington, D.C., November 1, 1920.

No seed injury was produced by treating wheat with either a 0.1 per cent (1 to 40) or a 0.2 per cent (1 to 20) solution of formaldehyde if the seed was germinated immediately after treatment.

If treated seed is held for several days or more before sowing, it is severely injured if allowed to dry without thorough aeration during the storage period. If, however, the seed remains damp, it suffers no injury from a 0.1 per cent solution and can be so kept indefinitely or until attacked by moulds.

Post-treatment injury is usually cumulative, increasing in degree the longer the seed is stored.

This seed injury upon drying apparently is due to a deposit of paraformaldehyde on the seed, which forms as the formaldehyde solution evaporates. The solid paraformaldehyde, being volatile, is constantly breaking down into formaldehyde gas. This gas, being thus concentrated and held so close to the seed, penetrates it slowly, probably going into solution in the testa.

The degree of post-treatment injury depends primarily on atmospheric humidity during the storage period. In atmospheres damper than 70 per cent humidity the treated seed can be kept indefinitely without ill effects. In those of 70 per cent, and less there is decided injury, which is most severe in the intermediate humidities, gradually decreasing in the lower ones until seed stored in an absolutely dry chamber is almost uninjured.

No paraformaldehyde formed upon the evaporation of formaldehyde solutions placed in these damper chambers in which no seed injury occurred, but it did form in all solutions evaporated in desiccators of 60 per cent humidity and less, the quantities by weight increasing as the atmosphere became drier. Therefore, seed injury in the desiccators was not determined by the quantity of paraformaldehyde formed on the seeds in each.

Untreated wheat, when placed in desiccators of varying atmospheric humidities alongside of evaporating, undiluted 36.2 per cent formaldehyde solutions, was least injured in the absolutely dry chamber and was entirely killed by the formaldehyde vapour in all the chambers damper than 30 per cent humidity.

In view of the facts that treated seed is less injured in very dry atmospheres than in intermediate ones and that untreated seed is least injured by formaldehyde fumes in the dry atmosphere of desiccators, it is considered probable that formaldehyde does not enter seeds as a gas or in the solid polymeric

form but in solution in the seed coats. For the maximum seed injury to occur as a result of drying after formaldehyde treatment, therefore, there must be an optimum atmospheric humidity to permit, first, the formation of paraformaldehyde, and second, the solution of formaldehyde gas in the seed.

This post-treatment injury is minimized by spreading the seed as it dries so that maximum aeration occurs, thus hastening the evaporation of paraformaldehyde and the escape of the gas from around the seed.

Barley is less susceptible to post-treatment injury upon drying after soaking in a 0.1 per cent solution, probably because of the protection afforded by the glumes; but when stronger solutions are used the injury is very severe.

Seed dried for an hour by being thinly spread on towels in the laboratory and then sealed in bottles is uninjured after weeks of storage; but seed dried longer, although uninjured by the rapid drying, is injured upon being sealed, presumably because of the concentration of gas in the bottle as a result of decomposition of the paraformaldehyde on the seed. Treated seed dried from 5 to 24 hours was more injured upon being sealed than when dried for a longer time.

The sorghums, Brown durra, Honey sorgo, and Sudan grass, are uninjured upon being stored dry after treatment, even when a 0.2 per cent solution is used.

Post-treatment injury from dry storage is entirely prevented by washing the seed with water immediately after treatment.

1117.—Fertile Wheat-Rye Hybrids Produced by Crossing Experiments in the United States.—LOVE, H. H., and CRAIG, W. T., in *The Journal of Heredity*, Vol. X, No. 5, pp. 195-207, Washington, May, 1919.

The writers have made a number of crosses between wheat and rye. Most of the resulting F_1 hybrids proved sterile, though in many of their morphological characters they were intermediate between their parents. Two fertile hybrids were, however, produced, and the results obtained from one of these crosses is described in this article. The variety of wheat known as Dawsons' Golden Chaff was crossed with common rye, and from this cross one plant was obtained. This F_1 plant gave every indication of being a wheat-rye hybrid. It had a few awns developed, particularly at the tip of the head. The glumes were brown, and intermediate in character between those of wheat and rye. They were keeled (rye character) and ciliate, and there was only a slight pubescence of the peduncle.

This hybrid plant was not completely fertile, but one seed was obtained from it, and the head of this F_2 individual was much like that of the female parent in F_1 but more awns were developed. This hybrid showed

its rye parentage in many ways: not only had it a larger number of awns, as has already been said, but the glumes were more sharply keeled and more ciliate. The peduncle was not pubescent at all. From this F_2 individual only one well-developed ripe viable seed was obtained. The F_3 plant resulting from this single seed showed fewer of the rye characters which had been conspicuous in the two previous generations, in fact, it did not show its hybrid nature to any great extent, as far as the head characters were concerned.

A number of seeds were sown from this plant, and an F_4 generation was grown. The hybrids thus obtained were very variable as regards the awns and the colour of the chaff and kernel. The colour seemed to follow a simple mendelian ratio of 3:1 similar to that occurring when two varieties of wheat (one pigmented and the other unpigmented) are crossed.

The ears were all more like wheat than rye; though in some respects they indicated their hybrid origin, the awns being considerably developed, and the glumes ciliated. Many of these plants resembled rye in the colour of their stems, and the general appearance of their vegetative organs. There is considerable variation as to the degree of sterility in these hybrids, some are entirely fertile whereas others (for instance Nos. 43 and 47) are nearly sterile. The shape of the kernels also varies considerably.

Some of the families of the F_2 generation have been carried further and they continue to produce descendants that are more wheat-like as far as their ears are concerned, while the rest of the plant shows some resemblance to rye.

Some of these hybrids are now being tested under field conditions to determine whether they have inherited any of the winter hardiness of rye. If a plant could be obtained which combined the good qualities of wheat with the winter hardiness of rye, it would be possible to sow later than is now done, and to grow crops in areas where the winters are too severe for wheat.

30.—Transmission of Dwarf Character in Marquis Wheat, in Canada.—CUTLER, G. H., in *Journal of the American Society of Agronomy*, Vol. II, No. 2, pp. 76-78. Washington, Feb., 1919.

When he was professor of the University of Saskatchewan the author noticed the occurrence of a dwarf plant (9 inches high) in a field of Marquis wheat. Desiring to study this phenomenon from a genetic standpoint, he selected 200 typically normal heads and sowed separately 20 seeds of each head. Even before harvest it was easy to notice the characteristic variations in some rows, especially in row No. 186, which included: plants from 9 to 40 inches high; normal tall

plants; dwarf plants; intermediate plants. As a whole these plants had the characters of descendants in F_2 , confirmed by the following facts: (1) in subsequent generations of dwarf plants the proportion of dwarfs reached 100 per cent; (2) the tall plants produced exclusively tall normal plants; (3) the intermediate plants produced 25 per cent dwarfs (Mendelian ratio=1 dwarf: 3 normal). Both for wheat and oats the dwarf character would, therefore, depend on a single determinant, recessive in relation with the determinant which dominates the normal growth of the plants. The occurrence of dwarf forms of wheat had previously been observed and studied by Richardson and by Farmer in Australia.

Marquis Wheat in the United States.—*U.S. Dept. of Agriculture, Weekly News Letter.* Washington, D.C., December 29, 1920.

That Marquis wheat¹ is the leading variety of common wheat for growing in the Northern Great Plains is the conclusion reached by specialists of the United States Department of Agriculture as a result of varietal experiments with spring wheat conducted at 11 field stations in the northern half of the Great Plains area chiefly in co-operation with the State experiment stations. Details of the experiments, including discussions on the principal varieties, how and when they come to the region, and how to distinguish them, are contained in Department Bulletin 878, *Varietal Experiments with Spring Wheat on the Northern Great Plains*, recently issued by the department.

Marquis wheat was first introduced into the United States from Canada in 1913, but is now more widely grown than any other variety. It is short-strawed and early maturing, which characteristics sometimes enable it to escape rust and drought.

A demand for information on comparative yields of varieties and their resistance to disease was developed in the Great Plains area by severe losses which have occurred recently, due principally to drought and rust. Although crop yields have sometimes been low, land values have continued to increase in about the same proportion as in other sections. This has increased the cost of production and, with a return to lower prices for wheat, it is essential that the poorly adapted varieties be eliminated.

Hundreds of foreign and domestic varieties of wheat have been obtained by the department and tested. In preliminary nursery experiments many of them did not show themselves fitted for culture in the semiarid sections. These varieties were rejected and

only the more promising ones were selected to be grown in plat experiments.

In Bulletin 878 the annual yields of the spring wheat varieties grown during the seven years, from 1913 to 1919, are shown for each station. A summary of the yields shows that, in general, the Marquis variety is the highest yielding common spring wheat. It has been included in all of the experiments each year. The better varieties of Durum wheat have outyielded Marquis at all stations but one. The Kubanka Durum wheat outyielded Marquis at eight of the ten stations where it was grown.

Data on rust infection were obtained at seven stations. Marquis wheat shows an average rust infection of 17.7 per cent in twenty observations. Most of the important commercial varieties of common spring wheat showed a higher percentage of rust infection than Marquis, while all varieties of Durum wheat showed less rust.

The leading varieties of spring wheat grown at the eleven stations were milled in an experimental mill and the flour baked into bread in order to determine their relative values for flour and bread-making. It was found that growing conditions and disease had much influence on the percentage of flour obtained, Marquis wheat yielding as low as 56.4 per cent of flour from sections where it had been affected by rust, while under favourable conditions it produced as high as 75.8 per cent of flour. The average yield of flour from 37 samples of this variety was 70.2 per cent. Several varieties of common wheat produced distinctly lower percentages of flour than Marquis. Preston (Velvet Chaff) and Haynes Bluestem produced about the same percentage as Marquis. Prelude was the only variety of common spring wheat which had a distinctly higher flour yield than Marquis, the difference being 2.6 per cent. All varieties of Durum wheat, however, yielded a higher percentage than Marquis, except D-5, a red-kerneled Durum wheat which is low in milling value. Each wheat sample was analyzed for nitrogen and the crude protein content determined. Marquis wheat had an average protein content of 15.3 per cent, and other common spring wheats differed only slightly from it.

In concluding the experiments, flour made from each variety of wheat was baked in order to determine the expansion or strength of the dough, the quality of the gluten, and the resulting texture and lightness of the bread. The average loaf volume obtained from 37 samples of Marquis wheat was 2,342 cubic centimetres from 340 grams of flour. This was a greater volume than was obtained from any other variety of wheat except one. All varieties of Durum wheat have a smaller loaf volume than Marquis.

¹ Dr. Charles Saunders, Dominion Cerealists, is the originator of Marquis Wheat.

Experiments with Kherson and Sixty-Day Oats.—WARBURTON, C. W., and STANTON, T. R., in *United States Department of Agriculture, Bulletin* 823, pp. 72. Washington, D. C., 1920.

This bulletin is a compilation of results from oat variety experiments, including Kherson and Sixty-Day, conducted by this Department and the State experiment stations, independently and in co-operation for periods ranging from 4 to 14 years and covering a wide scope of soils and climatic conditions. The histories and descriptions of the two varieties are included, together with brief statements on yields of straw, weights per bushel, percentage of hull, and improvement work. The yield data from the different stations are tabulated in both detailed and summarized form, and with the aid of numerous diagrams are fully discussed. In conclusion, the authors designate the varieties and types that have proved best for each section of the country. A list of 51 titles, comprising literature cited, is appended.

A general consideration of the results noted led to the conclusion that the early varieties, Kherson and Sixty-Day, yielded well in most of the spring-oat sections of the United States. The summary of average results indicates that at more than 50 per cent of the stations under a wide range of climatic conditions, early varieties have outyielded midseason and late varieties. Kherson and Sixty-Day are said to have given the best results in the warmer humid, subhumid, and semiarid sections. Late varieties were superior in yield to those of the midseason group at only a few stations.

38.—Origin, Production and Value of the Seeds of Conifers.—PICCIOLI, L. (Professor of silviculture, apiculture, and technology, at the Royal Forestry Institute of Florence), in Extract from *Annali del R. Istituto superiore forestale nazionale*, Vol. IV-V, pp. 185, 190. Bibliography, Florence, 1920.

Monograph on the seeds of conifers containing the following chapters: Importance of heredity of mutations.—Effects of origin.—Prohibition of exportation.—Private, commercial, and State production.—Importance of the choice of trees for the quality of seeds.—Periodicity of abundant seedings, and causes which determine them.—Collection of fruit.—Extraction of seeds from their cones.—Sorting.—Volume, weight and production, per unit of fruits and seeds.—Fertility, lasting power, and preservation of seeds.—Frauds, and the utility of a control station.—Morphological characters for recognizing seeds.

This last chapter, which contains numerous data, may be usefully referred to in the work of control of seeds.

The publication ends with a long bibliography.

41.—The Cultivation of Cotton in Australia.—*The Board of Trade Journal*, Vol. CIII, 1914, p. 485. London, Oct. 6, 1919.

48.—Cultivation of Flax for the Manufacture of Linseed Oil in the United Kingdom.—VARGAS EYRE and MORRELL, R. S., in *The Journal of the Board of Agriculture*, Vol. XXVI, No. 4, pp. 420-428. London, July, 1919.

Relation Between the Annual Precipitation and the Number of Head of Stock Grazed per Square Mile.—SMITH, J. W., in *United States Monthly Weather Review*, Vol. 48, No. 6, pp. 311-317. Washington, D. C., 1920.

A review of the available data indicates that wherever grazing is carried on throughout the year it is possible to establish a close ratio between annual rainfall and the number of head of stock that can be grazed per square mile. In New South Wales, for example, where the rainfall is between 20 and 30 inches, 250 sheep are grazed to the square mile; where it is between 10 and 20 inches, 100 sheep; and where under 10 inches, only 40 sheep to the square mile.

In the Great Plains States the relation between the annual precipitation and the number of head of stock that can be grazed per square mile can be fairly well established, the possible number decreasing with fair uniformity from east to west with the decreasing annual rainfall. The number grazed in Oklahoma and Texas is close to 50 per square mile where the rainfall is between 25 and 35 inches, and about 40 where the rainfall is from 15 to 25 inches.

In the Great Plains States north of Oklahoma, where feeding is necessary during the winter time and where the rate of evaporation is less in the summer months, the grazing rate averages close to 20 where the rainfall is between 10 and 15 inches, nearly 40 where it is from 15 to 20 inches, and nearly 80 where it is 20 to 25 inches. The ratio rises at a faster rate with heavier rainfall.

In all the Rocky Mountain regions it becomes more difficult to establish a ratio between the annual precipitation and rate of grazing because of seasonal distribution of precipitation, temperature variations, the topography, soil, evaporation, snow cover, nature of the vegetation, and differences in the length of the grazing period. In the central and upper Rockies the grazing rate is slightly greater with small rainfall amounts than farther east, because of the

shorter grazing period, but less than in the Great Plains with heavier precipitation, because of the relatively less grazing areas in the higher mountains, where the greatest precipitation occurs.

65.—Effect of Grazing upon Forest Reproduction.—I. SPARHAWK, W.K.N. Effect of grazing upon Western Yellow Pine Reproduction in Central Idaho, in *United States Department of Agriculture Bulletin* 738, *Contribution from the Forest Service*, pp. 31. Washington, D.C., 1918.—II. SAMPSON, A. W. Effect of Grazing upon Aspen Reproduction. *Ibid.*, No. 741, pp. 29, 1919.

The regulation and control of grazing is of far-reaching importance in the organization of absolute forest land for the continuous production of crops of timber. Too often in the past the United States has sacrificed reproduction in order to placate the cattle and sheep men, sacrificing thus reproduction at the most opportune time for obtaining it, and now it can only be secured by planting, often at prohibitive costs.

Throughout most of the western United States grazing on absolute forest land is of vast economic importance, and the forester accepts the general principles that grazing must be carried on as a part of forestry management.

He does not object so much to grazing as he does to unregulated grazing. In many parts of the western United States the present economic importance of grazing so overshadows the importance of the forest for the production of timber that there is grave danger in overgrazing much of the absolute forest land, which will lead to a gradual destruction of the timber now standing and more or less complete elimination of reproduction following fires and lumbering.

One of the most important problems dealing with large areas of the absolute forest land is how intensively can it be grazed without serious injury to it as a forest. The many researches conducted by the United States Forest Service and by other agencies in recent years have thrown much light on grazing problems in relation to natural reproduction.

I.—A recent study was made by the United States Forest Service of the effect of sheep grazing on a number of sample plots on three grazing allotments between 1912 and 1914 in the National Forest of Central Idaho. Sheep injure forest reproduction by browsing and by trampling. Slight browsing of the needles, of side branches, of the leader, or of the bark does practically no damage to the tree, though when repeated it may result in stunted growth or the death of the tree. Severe browsing, as occurs around bed grounds, often

kills the seedlings. Trampling usually is not serious. Damage to seedlings more than a year old is negligible; while as high as 100 per cent—an average of about 20 per cent for all plots—were killed when less than one year old. Western yellow pine (*Pinus ponderosa*) is injured the most by browsing, lodgepole pine (*P. contorta*) less so, and Douglas fir (*Pseudotsuga taxifolia*) least. White fir (*Abies concolor*) is practically never browsed. Of 1,782 seedlings killed, 73 per cent were less than a year old, and but five per cent were over six inches in height.

Injuries which did not result in death were greater late in the season than during the earlier period, due to drying of the forage as the season advanced. Those killed by grazing were greater earlier in the season than later, as the stem breaks more readily when succulent than after lignification has set in. Injury and death increased fairly constantly with increased intensity of grazing, though after a seedling's third year less than one per cent per year of the trees is killed by grazing of moderate intensity. More than three times as many seedlings are killed by other causes than sheep. Drought, winter-killing, rodents and birds, and fungous diseases, were the chief causes of death, while frost is responsible for minor injuries. The benefits of sheep grazing to the forest are through the reduction of fire by the destruction of the inflammable material and the aid to natural forest reproduction, which is often overestimated.

II.—Another study of the United States Forest Service deals entirely with the effect of grazing upon aspen reproduction. This study was conducted in the Monti National Forest, in Central Utah, and clearly shows that great damage to the natural regeneration of this species results from both sheep and cattle grazing, although the regeneration usually appears in dense stands and is almost entirely from root suckers. There is little or no aspen reproduction until the stands are severely opened up by lumbering or fire. Fully stocked reproduction is best after clear-cutting. The author's studies appear to show that even where sheep in moderate numbers are permitted to graze on such clearcut areas the aspen reproduction is often destroyed, almost, to the last sprout. The damage done by sheep is much greater than by cattle, and the damage by both depends upon the duration and intensity of the grazing.

The experiments extended over a period of five years, and sample plots were established on clear-cut areas, which were studied each year and records made of the reproduction. Some of the plots were lightly grazed, others moderately grazed, and still others heavily grazed. The amount of damage on all plots varied somewhat with the season. The mortality of one-year-old

sprouts, even under light grazing, is so high it is reasonably sure to have a determining effect on the stand of timber. If the sprouts that appear the first year after clear-cutting are destroyed by grazing, the sprouts, the succeeding year, are much less vigorous. Those produced the third season and later are distinctly lacking in vigour and are of little value for regeneration. Aspen sprouts grow rapidly, and at the end of three years they attain a height which exempts them from destructive grazing by sheep, and after four or five years are damaged little by cattle. The problem, therefore, seems to be the protection of reproduction for a period of three or five years after clear-cutting, or at least to protect it adequately to assure reproduction in fully stocked stands. Although the author believes that very light grazing by sheep may do little harm, he does not believe it practical to attempt sheep grazing for a period of three years after clear-cutting. He is of the opinion, however, that the moderate grazing of cattle will still permit a sufficient number of sprouts to survive to form a fully stocked stand. It appears to be necessary in order to obtain an aspen reproduction either to exclude stock altogether for a period of three years, or in the sheep country to shift from sheep to cattle for a three-period when sheep can again be safely grazed. Where the aspen is not in a cattle country the only necessity in order to obtain reproduction is to control the grazing and properly distribute the stock by means of drift and division fences.

The bulletins under review are additional evidence of the great injury to forest reproduction on absolute forest land by uncontrolled and unregulated grazing. The accumulated evidence of the past decade should force every thoughtful man to the realization that grazing is a serious menace to the natural reproduction of forests. The first duty of the forester is reproduction. Upon him falls the responsibility for successful crops of timber on absolute forest land under his control. It is his duty, therefore, and not of the stockman, to determine when and where stock should be grazed and when they should be excluded from given stands. It should be his province to decide the grazing possible within the limits of good forestry. The pressure for grazing areas in the western United States must not force grazing beyond the limits of the forest, thus causing its detriment and possible destruction.

LIVE STOCK AND BREEDING

- 67.—Poisoning of Calves by Iris, Observed at Abbotsford, British Columbia, Canada.—BRUCE, E. A., in *Journal of the American Veterinary Medical Association*, Vol. LVI, New Series, Vol. 9, No. 2, pp. 72, 74. Baton Rouge, Oct., 1919.

Linnaeus had previously observed that Irises are poisonous to cattle but cases of poisoning by these plants are rare. Some cases of human deaths caused by eating the rhizomes of *Iris versicolor* in mistake for those of *Acorus Calamus* and several other species considered poisonous because they contain bitter resins and iridine, a purgative glucoside, have been noted. The author has noted three cases of poisoning of calves of three, four and four and a quarter months respectively, which being shut up in an enclosure, ate the rhizomes of a species of *Iris* which chanced to lie on the ground; two of them died before the second day and the third succumbed on the fourth day. The principal symptoms were: profuse salivation; inflammation and hardening of the ganglions of the head and neck; appearance of ulcers on the lips and muzzle; acute pain in the belly; faeces tinged with blood shortly before death. Post mortem examination showed—irritation of the third and fourth stomach; black spots on the intestines; kidneys, liver and spleen very dark in colour.

- 1168.—Note on the Bacillus of Epizootic Abortion in Mares, Experiments made in Belgium.—BRUYNOGHE, R., in *Comptes Rendus des Seances de la Societe de Biologie* (Meeting of the Belgian Biological Society), Vol. LXXXII, No. 23, pp. 954-955. Paris, July 19, 1919.

The study of cultures obtained by inoculating gelatine with the foetal products expelled by female donkeys suffering from epizootic abortion enabled the writer to establish the fact that all the different lines of bacteria observed had the same characters and belonged to a single variety, namely to a variety of the paratyphic bacillus B. On consulting the literature on the subject, the author found that Lignieres, De Jouy, and Van Heelsberger had described a similar bacillus as the cause of epizootic abortion in mares. In order to decide the connection existing between the micro-organism isolated from the donkey and that obtained from the mare, the writer subjected the two bacilli in question to the agglutination test. He prepared the agglutinin by injecting a rabbit with dead bacteria isolated in the Congo. These experiments enabled him to establish the identity of the two lines of bacilli. The micro-organisms producing contagious abortion, in mares, which had been isolated on the spot, were agglutinated to the same extent as the bacilli used in the preparation of the serum. This proves the identity of the pathogenetic agent affecting asses and mares. The bacillus occasioning contagious abortion in donkeys had not been isolated before.

68.—Treatment of Horse Mange by Chloropicrin Fumes. (1).—BERTRANS and DASSONVILLE, in *Comptes rendus de l'Académie des Sciences*, Vol. 169, No. 10, pp. 486-489. Paris, Sept., 1919.

The energetic insecticidal action of chloropicrin having been already reported by the authors, they wished to try it in the treatment of horse mange. The horses were shut up in closed boxes, from which only their heads emerged through an opening, a canvas collar holding the head of the animal. In the boxes 20 gm. of chloropicrin per cubic m. were projected, by means of a syringe, furnished with a vaporizing nozzle, avoiding direct projection of the liquid (very irritating) on to the animals. The animals remain in the box for half-an-hour. The head of the horse is coated with an ointment composed of 2.5 gm. of chloropicrin to 100 gm. of vaseline. The vapour bath is repeated a second time at the end of two or three weeks. The results were entirely satisfactory.

Compared with the treatment of mange by sulphur dioxide fumes treatment by chloropicrin fumes has the advantage of being: more rapid (30 minutes instead of two hours); easier (there is no sensible increase in the atmospheric pressure inside the boxes, which does away with the necessity for absolute airtightness; besides the new method has no destructive effect on the material of the collars, requires no special vaporizer, etc.); is surer; and less dangerous to the animals.

70.—Determination of the Activity of Malleins.—FAVA, E., in *Il Nuovo Ercolani*, Year XXIV, No. 16, pp. 193-198; No. 17 pp. 209-218. Turin, August 31, and September 15, 1919.

The author insists on the expediency of extending State control to specific products, which might be of use in the diagnosis of infectious diseases. The toxic power of mallein can only be estimated by experimenting with this substance on animals suffering from glanders; the author proposed to determine if it was possible to obtain sure results by employing for the purpose guinea-pigs attacked by glanders. He used malleins prepared in seven different institutes: Italian, French and Swiss. He diluted them with physiological salt solution containing 0.85 per cent of sodium chloride in decreasing proportions, from 1:3 to 1:200; a quantity of the dilutions thus prepared was mixed with an equal volume of fresh superimmunized serum in a first series of tests; with one-half of the volume of serum in a second series; with two volumes of serum in a third series. The mixtures thus prepared, rendered homogeneous by shaking, were heated to 37°C., and read after $\frac{1}{2}$, 1, 2, and 4 hours, then placed at a laboratory temperature,

and read at the 20th hour. A series of tables gives the results of these experiments of precipito-reaction.

The malleins were tested in parallel on guinea-pigs given glanders by means of a bacillary emulsion, obtained from 24-hour cultures in glycerined agar, from a stock taken from the ass.

Some guinea-pigs were experimented on with malleins, 36 to 48 hours after the appearance of specific symptoms, others at an advanced stage of experimental contamination. The different malleins were given by an intracerebral injection, in doses of 0.05, 0.10, and 0.15 cc. diluted in an equal volume of 0.85 per cent physiological solution, and by an intravenous injection in a dose of 0.50 cc., diluted in a triple volume of physiological solution; two tables give the results so obtained.

The author remarks that the intracerebral injection does not allow of the exact estimation of the toxicity of malleins in guinea-pigs suffering from glanders, because the peptone contains amino bases (especially tyramin), which may cause in intracerebral inoculations a symptom resembling an anaphylactic shock.

Conclusions.—(1) The control of malleins, on subjects suffering from glanders (guinea-pigs), requires much time, and consists of a complex, delicate, dangerous and costly method. Moreover, this method* does not always give constant results, because of the intervention of the personal factor, which is not to be neglected, even if animals of the same age, of almost the same weight, infected by the same virus, and with the same quantity of it, are operated on.

(2) In the preparation of serum against glanders, Bertetti and Finzi used precipitogenous substances from *Bacillus mallei*, which give rise to super-rich serums of specific precipitins.

Functional groups (haptophorous and precipitophorous group) of precipitable substances (malleins), which, in the case specified, are the above-mentioned immunizing precipitogenous substances, find their corresponding specific in the precipitins of super-immunized serum against glanders.

(3) The precipito-reaction, obtained with super-immunized serums against glanders, is absolutely useful and practical because of its easy use, its simplicity, and its certainty in the estimation of the toxicity and of the activity of the malleins put on the market.

(4) The greater the degree of dilution, at which it contains sufficient quantity of precipitable substance, able to react with the precipitins of super-immunized serum against glanders, the more active is the mallein.

(1) See also Agricultural Gazette, November, 1920, page 920.

79.—The Nutritive Value of Coconut Globulin and Coconut Cake.—JOHNS, C. O., FINKS, A. J., and PAUL, M. S., in *The Journal of Biological Chemistry*, Vol. XXXVII, No. 4, pp. 497-502. Baltimore, April, 1919.

81.—Colour Inheritance in Mammals.—WRIGHT, S., in *The Journal of Heredity*, Vol. VIII, No. 5, pp. 224-235; No. 8, pp. 373-378; No. 9, pp. 426-430; No. 10, pp. 473-475 and 476-480; No. 11, pp. 521-527; No. 12, pp. 561-564; Washington, 1917; Vol. IX, No. 1, pp. 33-38; No. 2, pp. 87-90; No. 3, pp. 139-144; No. 5, pp. 227-240. Washington, 1918.

77.—Vitamines in Green Fodder.—OSBORNE, T. B. and MENDEL, L. B., with the co-operation of FERRY, E. L., and WAKEMAN, A. J., in *The Journal of Biological Chemistry*, Vol. XXXVII, No. 1, pp. 187-200. Baltimore, January, 1919.

The authors have studied the presence in certain green plants of fat-soluble and water-soluble vitamins by means of feeding tests on rats. In order to test for each of these vitamins, the product under study was fed in a ration rich in the other kind of vitamin. The following vegetable foods were tested: leaves and stalks of spinach; whole inside leaves of cabbage; whole young plants of alfalfa, clover and timothy grass; after drying in the air at 50-60°, then finely ground.

The results obtained indicate that ten per cent of spinach furnished a little less than the required amount of water-soluble vitamin, while the rats obtained abundance (for normal development) of fat-soluble vitamin; 145 per cent of cabbage leaf appears to be equivalent to about ten per cent of spinach in respect of water-soluble vitamin. Preliminary experiments with the other plants indicate that the content in water-soluble vitamin of clover and timothy grass is similar to that of cabbage, while alfalfa is a little richer. The content of fat-soluble vitamin appears to be very high.

According to the few data at present available, green vegetables supply an important addition to human diet, because the staple foods (cereals, potatoes, sugar, meat, fats, etc.) furnish too limited a quantity of either of these vitamins to satisfy wholly the requirements of an adequate diet.

80.—Importance of Salt in Food Rations of Cattle.—JOFFE, J., in *Journal of Dairy Science*, Vol. II, No. 3, pp. 159-169. bibliography of 8 titles. Baltimore, May, 1919.

The author proposed to review the literature on this subject, to bring to light the opinions put forward recently on the matter

and if possible to draw practical conclusions from them. These conclusions may be summarized as follows: Want of salt in the rations causes pathological conditions and gives rise to a loss of live weight and of vitality, and consequently, a decrease in yield. The experimental data worked out by the author indicate that the necessary amount of salt, according to the rations, should vary between 36.6 gm. and 40.7 gm. per day for each milch cow in the cowhouse. Some foods, such as soya beans and Kaffir corn (a variety of sorghum) require a larger amount of salt. At the Agricultural Experiment Station of Kansas only salt obtained by evaporation is used, rock salt being too coarse and irritating.

82.—French Horses in America, Especially in the United States.—GRAU, ALFRED, in *Journal d'Agriculture pratique*, Year LXXXIII, No. 40, pp. 808-812. Paris, Nov. 6, 1919.

It seems most probable, that, among the French breeds of horses, the draught, and particularly heavy draught, breeds will come to the front, owing both to their less delicate constitution, and the greater success in their production, and of their more ready and advantageous sale.

French breeds of draught horses have long been universally appreciated; in America, and in the United States in particular, they are the most appreciated. This is a very interesting fact for French export.

Americans prefer quiet and powerful animals, as large and heavy as possible.

Whether from the drier climate, or for any other reason, these breeds, once they have been exported to North America, have a tendency to fine down, and to decrease in weight and size at the end of several generations; for this reason, it is necessary to renew the blood frequently for good sires.

Among the draught breeds in France, some, such as the Nord and Ardennes draught horse, have suffered much from the war, and it will take time and much trouble to restore them, but these will not be lacking.

Compared with these breeds, the others such as the Boulonnais, Percheron, Nivernais breeds, the mule producing breed of Poitou, the Breton draught horse have not suffered.

86.—Alfalfa as Sole Food of Dairy Cattle in the United States.—WOLL, F. W., in *Journal of Dairy Science*, Vol. I, No. 6, pp. 447-461. Baltimore, March, 1918.

The two most important changes in American agriculture during the past 25 years are the introduction of the silo in cattle farming and the introduction or the extension of alfalfa cultivation. The silo has spread

from the east westwards and alfalfa from the west eastwards. At the present time alfalfa occupies over 30 per cent of the irrigated area of the United States and seven per cent of the entire area under hay and fodder crops. The proper utilization of a crop of this importance becomes therefore a most important economic problem for the individual farmer and for the community. Furthermore, the fact that a very large number of farmers in the western States practice the method of feeding cattle exclusively with alfalfa has raised the question whether this practice is really the most economical. The author's research, carried out during more than three years at the California Agricultural Experiment Station, aimed precisely at clearing up this point and it was purposed to relate and discuss the principal results that have been so far obtained. The experimental data at present include nine lactation periods for heifers fed, since the experiments began, exclusively on alfalfa, and nine lactation periods for heifers of similar age, breed, etc., fed on rations of alfalfa hay, silage, and mixtures of various concentrates (mainly rolled barley, dried beet pulp, coconut meal, and wheat bran).

Details of the two methods of feeding are given. The results clearly indicate the nutritive superiority of the mixed ration compared with that of alfalfa alone, at least so far as gain in live weight is concerned.

If the problem is considered from an economic standpoint, the practical results of feeding dairy cows may vary according to locality and the prices of foods. The problem only can be solved case by case, especially as there are plenty of examples of excellent results obtained by feeding with alfalfa alone. One herd of 23 stall-fed cows under test by one of the Cow-Testing Associations gave a general average of 410 pounds of butter fat on no other food but alfalfa throughout the year. However, it remains an established fact that mixed rations have an absolute superiority in the matter of production and growth, even if the superiority is only relative from an economic standpoint.

96.—Goat Breeding in the Pastures of the West in the United States.—CHAPLINE, W. R., in *United States Department of Agriculture, Bulletin No. 749*, 35 pp. Washington, 1919.

This Bulletin constitutes a general treatise on goat breeding in pastures. Numerous problems relating to breeding in open grazing grounds are studied chiefly in connection with:—the nature of the pasture; methods of management which will permit of profitable production of goats without detriment to cattle and sheep or to timber reproduction; increase of revenue derived from goats,

hair and meat by diminishing the losses caused by death; selection and care of the flocks.

The Bulletin ends with a summary of the more important points regarding management and breeding. The author recommends the division of the grazing ground into three parts for use in spring, in summer and autumn, and in winter respectively; the second part should be at the highest elevations, the third in the lowest and most sheltered parts; that portion of the pasture nearest to the sheds should be reserved for use in bad weather.

Over-grazing, which injures the pasture, tree growth, and the yield of stock, should be avoided; an equal or higher revenue will be obtained by grazing, on the same area, a smaller number of selected goats instead of an excessive number of low grade animals.

The most economical and satisfactory results are obtained with flocks of about 1,200 goats; it is best to graze separately goats in milk, dry goats, bucks, yearlings and weaned kids. Goats should be put out to graze for four or five hours in the cool of the morning and for a similar time in the evening; they should rest during the heat of the day. The bed grounds should be changed several times a year; it would be still better to graze the goats for short distances and to bed them at night where they happened to be in the evening; this allows of the grazing of a larger number and increases the production of goats, hair and meat while improving the pasture. The author recommends the Angoras as the breed best suited to the western States of America where goats are kept chiefly for their hair and meat, and secondarily for milk and their skins. Young goats under 18 months of age are not yet suitable for breeding. One buck kept with the does at night and fed with a little grain as a supplementary ration will serve 50 or more does. In 1915 and 1916, for different flocks of Angora goats kept on open grazing grounds in New Mexico, the cost per annum of yearlings was from 95 cents to over \$2 a head, exclusive of interest on the capital and the owner's labour; the average annual revenue for two year olds was about \$2 per head; that for yearlings was slightly higher; the annual cost of pasturage of does and their kids varied from \$1.62 to \$2.78 per doe, and the average annual revenue per doe from \$3 to over \$5.50.

103.—The Choice of Laying Hens.—ANDREW, R. C., in *Utility Poultry Journal*, Vol. IV, No. 9, pp. 2-5. Harper Adams Agricultural College, Newport, Salop, 1919.

The improvement of poultry stock can be obtained at small cost and with very little trouble by discarding all the defective birds at the right time, so as to keep only the best.

Age at which the choice of hens to keep and those to discard should be made.—In the egg-laying competitions which were held at Harper Adams Agricultural College, Newport, Salop, England, the following data respectively were obtained in the trials of 1915 to 1917 for 252 hens in the first year of laying, and for an equal number of hens in the second year: Number of eggs laid in a year by the 252 hens: 43,968 and 28,137; average number of eggs per pen of six hens: 1,046.8 and 670 average number per hen: 177.4 and 112; that is to say the hens, in the second year of laying only produced about 60 per cent of the number of eggs laid in the first year. In egg-laying competitions held in Australia the comparison has been carried up to the third year with the following results:—

White Leghorn breed: first year 209 eggs; second year 149; third year 123; Black Orpington breed: respectively 202, 156 and 118. Except in the case of exceptional merit, hens should, therefore, not be kept after the second year of laying.

Time of the year at which bad laying hens should be discarded.—Summer appears to be better than winter for the selection. The egg production by successive periods of four weeks each, dating from the commencement of laying (13 periods for hens in their first year of laying and 12 for those in their second year of laying) determined at Newport, reached its minimum in the third of these periods, its maximum about the seventh and decreased rapidly after the ninth, which ended about the middle of June.

The least profitable time for the selection of hens to be discarded is the beginning of spring, for then the cost of keeping the hens during the unproductive winter has been incurred and by not getting rid of them until a little later they would lay eggs which would cover the expense.

The poultry-keeper often makes the time of selection depend on the amount of food produced on the farm and available during different seasons of the year; but, it is never profitable to keep a hen which does not repay the cost of her food. To ascertain whether the eggs laid cover the cost of the

food consumed by the flock of hens, the following method may be useful: Divide the price of 100 pounds of food by the price of one dozen eggs and multiply the quotient by three; the result gives the number of eggs which should be laid daily by 100 hens to pay for the food. This formula is based on the assumption that each hen consumes four ounces of purchased food per day.

When a hen is in laying condition the pubic bones are relaxed, which increases:— (1) The distance between these bones; (2) the distance between the hinder end of the breast bone and these bones. Measurements made at Newport have proved that the distance between the pubic bones is on the average 1.3 inches for hens in laying condition and 0.8 inches in non-laying condition, and that the distance between the hinder end of the sternum and the pubic bones for White Leghorns (light breed) and White Wyandottes (heavy breed) respectively, is: hens in laying condition 3.1 inches and 3.6 inches; hens not in laying condition 2.1 inches and 3.29 inches. These differences are sufficiently large to be perceptible, the former when measured by the finger tips and the latter by finger widths. It is better to use fingers than an instrument because by so doing it is possible to feel the texture of the skin.

1202.—The Conformation of the Laying Hen.
—*Utility Poultry Journal*, Vol. III, pp. 24-25. Newport, Salop, 1918.

The annual conference and inspection of the trials held at the Harper Adams Agricultural College, Newport, Salop, England, in August, 1918, led to the appointment of a committee to consider the question of drawing up a standard to which the breeders of utility stock should endeavour to make their birds conform, without sacrificing, if possible, the characteristics of the distinct breeds. With the object of obtaining data upon which to draw up a standard, the college staff, at the request of the committee, undertook a series of measurements in October, 1918, on the birds in a number of representative pens of the various breeds represented.

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The measurements taken were:—

CONFORMATION OF BODY AND LAYING CAPACITY

	240 eggs and over	200-240 eggs	160-200 eggs	120-160 eggs	0-120 eggs
	in.	in.	in.	in.	in.
Breadth of back.....	3.75	3.7	3.5	3.6	3.2
Length of back.....	6.5	6.4	6.4	6.5	6.3
Length of keel.....	4.0	3.9	4.0	4.1	3.9
Abdomen.....	3.5	2.7	2.8	2.4	3.1
Distance between pelvic bones..	1.2	1.0	0.9	0.98	0.8
Girth measurement.....	14.25	14.0	13.7	13.8	13.4
Wyandotte: abdomen.....	3.7	3.6	3.2	3.4	3.0
Speckled Sussex.....			3.6	3.2	3.3
Light Sussex.....			3.6	2.8	2.7
Rhode Island Red.....		3.6	3.1	2.7	2.7

(1) *Length of back*, from the basal joint of the neck to the oil gland at the base of the tail; (2) *breadth of back*, taken between the inside of the fingers when spanning the depression on the hips; (3) *Length of keel*, from fore end to hind end; (4) *abdomen*, from the end of the keel to the pelvic bones; (5) distance between the pelvic bones; (6) *girth measurement*, taken by passing the tape completely round the bird in the same position as the measurement for breadth of back, the legs of the bird being directed backwards.

The subjoined table gives the averages of each of the six measurements for Leghorns, and only the averages of the fourth measurement for the other breeds, as this figure seems most indicative of laying capacity.

105.—Deer in New-Caledonia; Utilization of their Flesh by Canning.—*Bulletin de l'Office colonial*, Year XII, No. 140-141, pp. 533. Paris-Melun, Aug.-Sept., 1919.

Deer have become an apparently irremediable nuisance in New Caledonia. Near St. Vincent they are met with in numerous herds, and often in groups of over a hundred. They ravage and destroy everything. It is impossible to keep them out by fencing, because they leap the highest barriers. From Noumea to Bourail they infest the whole region.

The Pacific Packing Co., which has a preserving factory at Nemera, is attempting an experiment which will be welcomed by all, and more particularly by colonists and cattle-breeders. This is the preservation of venison. This company buys deer, unskinned and disembowled with care, at a price of 25 fr. a head and it organizes a rapid transport service to the factory by motor lorry. By this fortunate idea, hunting will become a paying business. Every one will use it to rid the colony of this harmful game.

FARM ENGINEERING

1222.—Trials of Mechanical Cultivating Machines in France.—I. SANIER, HENRY, La Semaine de Motoculture de Printemps, in *Journal d'Agriculture Pratique*, Year LXXXIII, New Series, Vol. XXXII, No. II, pp. 214-218, 4 figs. Paris, April 17, 1919. II. La Semaine de Motoculture de Printemps, *Bulletin de la Chambre syndicate de la Motoculture*, No. 4, 56 pp., Paris, April, 1919. III. CLARON, CH., Les Journees de Motoculture des Bouches-du-Rhone, in *Le Progres agricole et viticole*, Year XXXVI, Vol. LXXI, No. 23, pp. 534-539, Montpellier, June 8, 1919.—IV. GREILSAMMER, R., Les tracteurs aux essais de Strasbourg, in *Journal d'Agriculture pratique*, Year LXXXIII, New Series, Vol. XXXII, No. 22, pp. 451-454, Paris, July 3, 1919.

This excellent illustrated article (pp. 1219-1228 of "The International Review of the Science and Practice of Agriculture") will be sent to any one who may desire it.

1225 and 110.—Review of Patents.

In each number of the International Review of the Science and Practice of Agriculture a list of the new patents of agricultural machinery in different countries is given. the following are a few interesting patents mentioned in the last two numbers of the Bulletin received:—

Canada.—190960 Stone collector; 191303 Manure loader; 19134 Straw transporter and spreader; 191371-191539-191679 Apparatus for weed killing; 191732 Stump remover; 191505 Pig Oiler; 191541 Poultry rearer (foster mother); 191212 Support for milk pail; 190790 Cattle counter; 192588 Mechanism for compressing silage.

Netherlands.—3438 Device for fixing strakes or grips to wheels of vehicles, especially for cultural machines; 3446 Pipe for warming

the soil surface in nurseries and for maintaining its moisture; 3157 Preparation process for a vegetable milk and its derivatives.

United Kingdom.—125815 Hand hoe and seeding machine combined; 126473 Flax pulling machine; 127474 Process for making a soft cheese from skim-milk; 130963 Manure obtained by heating minerals or ground potassic rocks (leucite, volcanic ashes, felspar, granite, etc.) with carbide of calcium, in a current of nitrogen; 129839 Granulated food for poultry (prepared with a sticky mash of ground clover, boiled potatoes, and water, which is divided, dried, roasted, and finally impregnated with fish oil)

United States.—1305059 Harrows with attachment for destroying locusts; 1313310 Machine for destroying weeds.

New Zealand.—40378 Use as manure of flax residues (ash, liquor); 41154 Grass scythe; 40232 Flax scutcher; 40291 Wind motor; 40395 Food mixer for live stock; 39726 Arrangement for preventing cattle and horses from jumping.

France.—402822 Process and plant for rapid cooking and drying of fresh blood as animal food; 393749 Apparatus for sharpening scythes; 493805 Hive, round, made of rye straw, very low interchangeable blocks, and very light interior frames of variable size; suitable covers separate the blocks; the whole is securely fastened with hooks and eyes; 492541 New method of fishing with light.

Switzerland.—82736 Apparatus for separating the seeds of cereals from the seeds of weeds; 73443 Felling and logging machine.

RURAL ECONOMICS

115.—**The Cost of Milk Production Computed on the Year Basis.**—PEARSON, F. A., in *Illinois Agricultural Experiment Station Bulletin* 216, pp. 343-364. Urbana, Ill., 1919.

These studies were undertaken to derive workable formulae that would express the cost of producing fluid milk (for the Chicago market) in terms of amounts of feed and labour used, and not of the monetary value of the expenses incurred.

A study of the herd cost is based upon the records during the fiscal years 1914-15 and 1915-16 of 36 farms on which there were 873 milch cows, 225 calves (and heifers not in milk) and 35 bulls, and where 6,511 pounds of milk and 235 pounds of butter fat were sold per cow during the period. Production in the six winter months was 56 per cent of the yearly total. The gross cost of producing 100 pounds of milk was found to average \$2.25, the percentage of the several items

being: Feed other than pasture 60.7; pasture 5.3; man labour 17; horse labour 3.4; interest on herd 4.9; building charges 3.6; equipment 1.3; and miscellaneous 3.8. A managerial charge was not included. The cost other than for feed (excluding pasture) and man labour totalled 50.16 cents, which almost exactly balanced the 49.69 cents credit from appreciation of stock, manure, hides, beef and other miscellaneous returns. The production cost on these farms can thus be expressed in terms of feed and labour. The amounts per 100 pounds of milk were approximately 44 pounds of grain, 188 pounds of silage and other succulent feed, 50 pounds of hay; 39 pounds of other roughage and bedding; 2.42 hours of man labour. This is the formula for "year cost."

To correct for seasonal variations in cost of production it is suggested that the price of any month be that percentage of the year cost which represents the average variation of that month from the average year price during the period 1907-16. A table showing these monthly percentages is given. It is noted that only 61.8 per cent of the grain fed was purchased, whereas in farms providing milk for New York city the purchased grain was about 98 per cent of the total (A. L. Thompson, *Cost of Producing Milk in 184 Farms in Delaware county, New York*, in the *New York Cornell Station Bulletin* 364, pp. 109-179, 1915).

In 16 of the above farms embracing 428 cows, the records permitted the separation of the cost of rearing young stock from the herd cost, the difference being the "cow cost." The net cost of producing 100 pounds of milk on this basis was \$1.70, which is 215.6 per cent of the cost of feed (excluding pasture) and man labour. The amounts of feed and labour were approximately: Grain 35 pounds; silage 140 pounds; hay 36 pounds; other roughage 29 pounds; and man labour 2.36 hours. To find the year cost on this basis it is necessary to increase the total of these items by 25.6 per cent. Corrections for seasonal variation may be made as before.

A short discussion of some data from 680 dairy farms in Kane and McHenry counties in Illinois is given, mainly to show that the "farm cost", obtained by deducting from the total farm expenses the receipts derived from all sources except the dairy, is a misleading measure of milk production costs.

AGRICULTURAL INDUSTRIES

1239.—**Textilose.**—Breitenstein, A., in *La Revue de la Filature et du Tissage*, Year III, No. 15, pp. 168-170. Epinal.

A new industry is becoming established: the manufacture of yarn and fabrics of paper, either alone or mixed with textile fibres.

The paper is moistened (it may be of advantage to add hygroscopic salts to the water used for this purpose) and cut up in strips which are made into round threads or into cords by spinning, twisting and winding.

In order to get stronger or finer threads, textile fibres, preferably cotton, are mixed with the paper. A carding machine placed in front of the paper machine deposits the fibre on the sheet of pulp and the two materials mix intimately. To accentuate the action of the fibre, the latter may be applied to both sides of the paper.

Yarns of "textilose" seem to have a sure future, especially for the making of packing sheets, carpeting and furniture stuffs, and even for some kinds of dress materials.

1250.—Fly Pupae in Bottled Milk.—RILEY, W. A., in *Journal of Dairy Science*, Vol. II, No. 3, pp. 183-188. Baltimore, May, 1919.

The writer found in a quart bottle of certified milk, 30 pupae of *Drosophila ampelophila* attached to the glass. Dr. Fettick mentioned a similar occurrence in 1913 in Budapest. The flies lay their eggs on the interior surface of empty bottles, and within less than a week, the pupae emerge, and attach themselves so firmly to the glass, that they are not removed, even when the bottles, on reaching the dairy, are put through the washing machine. The writer insists upon the necessity of the returned bottles being washed in the dairy in an almost boiling solution of caustic soda, and urges consumers to wash their bottles as soon as they are empty, and to replace the cap.

1252.—The Household Foam Test for Butter and Oleomargarine.—SOMMER, H. H., in *Journal of Dairy Science*, Vol. II, No. 2, pp. 142-144. Baltimore, March, 1919.

One of the household tests for distinguishing between butter, and oleomargarine and renovated butter is the "foam test". Butter when heated boils quietly with an abundant production of foam, whereas oleomargarine and renovated butter sputter and do not produce so much foam. The author investigated the cause of this difference, which is the subject of this article, and he came to the following conclusions:—

(1) Fats will foam if the water that they contain is held finely divided in suspension; they sputter if the water gathers in droplets.

(2) The curd in butter is finely divided and holds small particles of water in suspension; therefore butter foams.

(3) The curd in oleomargarine and renovated butter is coarse and allows the water to gather in droplets; therefore oleomargarine and renovated butter sputter.

(4) Certain "butter substitutes" that contain finely divided substances capable of holding water may foam as well as butter.

122.—Antiseptic Action of Spices in Preserved Foods.—LAHACHE, JEAN, in *L'Industrie française de la Conserve*, Year V, No. 29, pp. 211-214. Paris, August, 1919.

The author gives an account of investigations on the antiseptic action of spices in preserved foods. All this subject is, so to speak, in its infancy, and will be continued. But already attention should be drawn to the preliminary results obtained, which establish absolutely the antiseptic action of certain spices. The spices most generally used are black pepper, Cayenne pepper, ginger, mustard, cinnamon and cloves. The first three, in the experiments, only prevented fermentation and putrefaction for a very short time. But mustard, cinnamon and cloves (whose antiseptic principles are their essential oils) are much more effective. They are powerful antiseptics, even in the small quantities in which they are used in food industries. Anyhow, these spices have an antiseptic action decidedly greater than that of the usual chemical antiseptics of which, moreover, the use is expressly prohibited by French law, while that of spices is legally permissible and is in no way contrary to hygiene.

1258.—Preparation of Strawberries for Market.—MORE, C. T., and TRUAX, H. E., in *Farmers' Bulletin* 979, *United States Department of Agriculture*, pp. 27. Washington, D.C., May, 1918.

This bulletin describes efficient methods of preparing strawberries for market. The phases discussed include importance of good handling, the labour problem, picking, grading, commercial strawberry grades recommended, packing, packing sheds, shipping packages, standardization of package, branding and marking, inspection and loading sheds, and loading cars.

PLANT DISEASES

135.—Chemical Investigations on Agents for Combatting Fungoid Diseases and Insects.—(1) MOND, E. L. and HEBERLEIN, C., in *Journal of the Chemical Society*, Vols. 115-116, No. 682, pp. 908-922, London, August, 1919.—(2) RAMSAY, A. A., in *The Agricultural Gazette of New South Wales*, Vol. XXX, Pt. 6, pp. 428-429. Sydney, June, 1919.

The first part of the article deals with the chemistry of Burgundy mixtures.

The question of combining insecticides and fungicides in the treatment of orchard pests is attracting more and more attention, for the obvious reason that such combinations

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may represent substantial savings both in time and money.

The diagram is supplemented by the table indicating what mixtures may safely be made and also the unreliable sprays.

TABLE OF COMPATIBLE AND NON-COMPATIBLE SPRAYS

Spray	May be mixed with	Must not be mixed with
Alkali sulphides (liver of sulphur).	Soap, washing soda.....	Bordeaux, Burgundy, lead arsenate, Paris green.
Ammonia copper carbonate..	Tobacco infusions, concentrated tobacco extracts.	Bordeaux, Burgundy, lead arsenate, Paris green.
Bordeaux mixture.....	Lead arsenate, Paris green, concentrated tobacco extracts, tobacco infusions, soap.	Alkali sulphides, lime-sulphur, certain oil emulsions, resin wash, washing soda.
Burgundy mixture.....	Concentrated tobacco extracts.....	Alkali sulphides, lead arsenate, lime sulphur, Paris green, resin wash, soap, washing soda.
Ferrous sulphate and sulphuric acid.	To be used alone.....	
Iron sulphide.....	Bordeaux, lime-sulphur.....	
Lead arsenate.....	Bordeaux, lime-sulphur, sulphur (atomic) concentrated tobacco extracts, tobacco infusions.	Ammonia copper carbonate, alkali sulphides, resin wash, soap, tobacco infusions, washing soda.
Lime-sulphur.....	Iron sulphide, lead arsenate, concentrated tobacco extracts.	Bordeaux, Burgundy, resin wash, soap, tobacco infusions, washing soda.
Paris green.....	Bordeaux, concentrated tobacco extracts	Alkali sulphides, ammonia copper carbonate, resin wash, soap, washing soda.
Resin wash.....	Kerosene emulsion, concentrated tobacco extracts.	Bordeaux, Burgundy, lead arsenate, lime-sulphur, Paris green, tobacco infusions.
Soap.....	Alkali sulphides, Bordeaux, tobacco infusions, concentrated tobacco extracts, resin wash, washing soda.	Burgundy, lime-sulphur, lead arsenate, Paris green.
Sulphur (atomic).....	Lead arsenate, Paris green.....	
Soap-oil emulsions.....		Lead arsenate.
Tobacco extracts, concentrated.	Ammonia copper carbonate, Bordeaux, Burgundy, lead arsenate, lime sulphur, oil emulsions, resin wash, soap, tobacco infusions, washing soda.	
Tobacco infusions.....	Ammonia copper carbonate, alkali sulphides, lead arsenate, soap, concentrated tobacco extracts, washing soda.	Lime sulphur, lead arsenate, Paris green.
Washing soda.....	Alkali sulphides, emulsified oils, soap, concentrated tobacco extracts, tobacco infusions.	Burgundy, Bordeaux, lead arsenate, lime-sulphur, Paris green.

142.—Experiments with Tumours Caused by Bacteria in Pines.—DUFRENOY, J., in *Comptes rendus des seances de l'Academie des Sciences*, 2nd Half 1919, Vol. CLXIX, No. 12 (Sept., 22 1919), pp. 545-547. Paris, 1919.

At Bareges (in the upper Pyrenees Department), *Pinus sylvestris* and *P. Laricio* are deformed by resinous swellings of bacterial origin, identical with those on the maritime pine, and, as experiments have shown, transmissible from tree to tree.

The action of the *Coccus* on the pine, while at first stimulating, brings on the development of hyperplasia, cells filling up air spaces or canals, sacs especially on the border of medullary rays. Finally there follows the resinous liquidation of the tissues.

1263.—The Metagenetic Stage of Leptophaeria Tritici, an Ascomycete Injurious to Wheat.—DURRELL, L. W., in *Science*, New Series, Vol. L, No. 1289, pp. 252-253. Lancaster, Pa., September 12, 1919.

In the state of Iowa, United States, a species of what seemed to be an *Ascochyta* has frequently been found on dead straw. Recently, while cultivating *Leptosphaeria tritici*, the relationship existing between these two forms was revealed.

The pycnidial fruiting bodies grow side by side with the perithecia of *L. tritici* on dead wheat straw in the spring, and are difficult to distinguish from them, both being dark, submerged, and of the same size, though the ostioles of the perithecia are more protruding. The pycnidia are filled with gluttulate stylospores, usually divided by a transverse septum; their size, shape and manner of production suggest *Ascochyta graminicola* as described by Frank. Single spore cultures of the ascospores of *L. tritici* obtained by the Hansen method of isolation, produce on potato agar, and on sterile straw, pycnidia and stylospores like those found growing on the wheat plant together with the perithecia of *L. tritici*.

1265.—Formaldehyde as a Means of Controlling Wheat Scab (*Gibberella Saubinetii*) and Other Seed-Borne Diseases of Cereals.—MELHUS, J. E., and RHODES, L. L., in *Science*, New Series, Vol. 2, No. 1279, p. 21. Lancaster, Pa., July 4, 1919.

Experiments carried out at the Iowa Experiment Station, United States, for the purpose of ascertaining the effect of hot formaldehyde upon *Gibberella Saubinetii*, proved that placing wheat in a formaldehyde solution at 50°C. such as is used in the case of potato scab (*Oospora scabies*), was either ineffective in killing the fungus or destructive to the viability of the seed.

In order to overcome these difficulties, the grain was suspended just above the formaldehyde solution (one part in 240 parts of water), and the temperature raised to 98-99°C., the time of exposure being reduced to 20 seconds.

Under these conditions, all the fungi in, or on, the seed were killed, and in the majority of cases the bacteria were also eliminated. This momentary treatment did not injure the germinating capacity of the seed. The fungoid flora of wheat seeds was destroyed in 20 seconds, while the germinating capacity of the grain was not injured in 40 seconds, and only slightly impaired in 50 seconds. It is believed that this method can be made practical for the control of *G. Saubinetii* and other seed-borne diseases of cereals.

1268.—*Bacterium Translucens* Var. *Undulosum* N. Var. Injurious to Wheat in the United States.—SMITH, E. F., JOBES, L. R., and REDDY, C. S., in *Science*, New Series, Vol. L, No. 1280, p. 48. Lancaster, Pa., July 11, 1919.

The continued prevalence in the United States of the disease known as black chaff

of wheat makes it desirable to have a scientific Latin name for the bacterial organism causing it. This micro-organism resembles *Bacterium translucens*, the cause of the bacterial blight of barley. In cross-inoculations on the leaves of seedling plants the barley micro-organism on wheat has proved either non-infectious, or has produced small non-typical lesions.

On the other hand, inoculation experiments have shown that the wheat micro-organism is practically as pathogenic on barley as it is on wheat, and the lesions so produced on barley are indistinguishable from those produced by the barley micro-organism itself. Therefore, the authors suggest that for the present at least, the wheat micro-organism be distinguished as *Bacterium translucens* var. *undulosum* n. var. with, in general, the characteristics already given for the species. *Bact. translucens* var. *undulosum* produces yellow or translucent stripes on leaves, water-soaked or black stripes on culms, and longitudinal, more or less sunken stripes or spots on the glumes. In moist weather, the bacteria often ooze to the surface of the diseased spots or stripes as tiny drops that become yellowish on drying. The bacterium attacks also the kernels, especially at the base, causing them to be shrunken and honey-combed with bacterial pockets. Even when the kernels are not directly attacked, their surface is liable to be infected from the diseased glumes. When the disease is severe, the heads are dwarfed.

In the infection experiments carried out, positive results were repeatedly obtained on wheat leaves and glumes. The disease is transmitted to young seedlings by way of the wheat kernels. It occurs in all the wheat states of the middle west.

1270.—*Oospora Pustulans* n.sp., a Hyphomycete Causing the Skin Spot Disease of Potato Tubers in the United Kingdom and Canada.—OWEN, M. N., in *Royal Botanic Gardens, Kew, Bulletin of Miscellaneous Information*, No. 8, pp. 289-301. London, 1919.

It was proved by the experiments carried out by the author at Kew, that the disease of potato tubers known in England (Lincolnshire), Ireland, and Canada (Quebec) by the name of skin spot is caused by a fungus belonging to the Hyphomycetes. The fungus is not *Spicaria Solani* Harting, as had been previously thought, but a minute species hitherto undescribed which appears most suitably placed in the genus *Oospora*, and is described as a new species, *O. pustulans* (Owen and Wakefield).

This mucedinacea grows readily as a saprophyte in culture (agar, gelatine, etc.), but more freely on sterilized vegetable tissues.

Field inoculations with spores of the fungus gave positive results in a certain number of cases, the characteristic spots being produced on the tubers, and the fungus was re-isolated from the affected tubers. Further work on the life-history of this hyphomycete is required, as it is not certain whether the tubers are infected in the soil only, or also during storage. The exact type of soil, and the general conditions under which skin spot develops with special virulence are not yet clear.

With regard to the injury caused by the disease, the fungus is confined to the surface layers and is often sharply isolated from the mass of the flesh by a layer of cork cells.

The only preventive measure which can be recommended at present is to avoid planting diseased tubers. If badly-affected tubers are planted, not only are "misses" (failures in germination) likely to occur, but the soil will probably be seriously infected with the skin spot fungus.

INJURIOUS INSECTS

143.—**Legumes of the Genus *Deguelia* (*Derris*) and their Use in Checking Insects and other Injurious Invertebrates.**—MC-INDOO, N. E., SIEVERS, A. F., and ABBOTT, W. S., in *Journal of Agricultural Research*. Vol. XVII, No. 5, pp. 177-200. Washington, D.C., August 15, 1919.

The genus *Deguelia* Aubl.—synonymous with *Derris* Lour.—belongs to the leguminous family and includes several species already found to be insecticides or poisonous; the ground roots of one species, probably *Deguelia elliptica* (Wall.) Janb.—synonymous with *Derris elliptica* (Wall.) Benth.—are sold as an insecticide; *D. elliptica* is a strong fish poison and is much used in the East Indies for catching fish.

Of the different insecticides on sale, some act on the stomachs of insects affected, others by contact; the authors show that powdered roots of *D. elliptica* and *D. uliginosa* (DC) Baill.—syn. *Derris uliginosa* (DC) Benth.—act at the same time in both ways, but are of no value as fumigators.

The authors studied the following materials: powdered roots of a species of *Derris*, probably *D. elliptica* bought on the market; roots of *D. elliptica* called "tuba", or "toeba" in the Dutch East Indies, from Buitenzorg (Java); stems of *D. uliginosa* from Sauva (Fiji Islands); stems of *D. Koolgibberah* Baill. and of *D. oligosperma* from Brisbane (Queensland, Australia); roots of *D. scandens* Benth., and roots and stems of *D. robusta* Benth. from Sibpur (Calcutta, India).

On extraction with boiling denatured alcohol, they obtained from these substances

the following percentages of extract; respectively 14.25, 8.50, 8.50, 10.30, 22.50, 20.30, 16.70 (roots of *D. robusta*) and 15.70 (stems of same species.) Of the six species tried, only two, *D. elliptica* and *D. uliginosa*, were found satisfactory for use as insecticides.

Several writers state that the toxic principle of the *Deguelia* species is a resin that acts on the different classes of animals according to the development of their nervous system. It kills some insects easily, others with difficulty, but usually its action is slow and it apparently causes death by paralyzing the motor organs. The extract obtained with denatured alcohol applied in the form of a spraying mixture has proved effective on certain aphidae (*Myzus persicae*, *Macrosiphum lirioidendri*, *Rhopalosiphum pseudobrassicae*, *Aphis helianthi*, *A. gossypii*, *A. spiraeicola*), and on larvae of *Leptinotarsa decemlineata* and the small caterpillars of *Hyphantria cunea*. It is possible to incorporate extracts of *D. elliptica* and *D. uliginosa* in soft soap; by simply dissolving them in plenty of water a solution ready for spraying can be obtained.

It has been found that commercial *Derris* sp. powder as ordinarily used is efficacious against dog fleas (*Ctenocephalus canis*) chicken lice (several species of *Mallophaga*), the house fly, three species of aphids (*Aphis rumicis*, *A. pomi*, *Myzus persicae*), the larvae of *Leptinotarsa decemlineata* and the small caterpillars of *Hyphantria cunea*, but it is of no practical value against bed bugs (*Cimex lectularius*), roaches (*Blattella germanica*), chicken mites (*Dermanyssus gallinae*), mealy bug of lemon and orange trees (*Pseudococcus citri*), *Orthezia insignis*, *Tetranychus bimaculatus*, larvae of *Lepidosaphis ulmi*. Used as a powder in suspension in water, with or without soap, under practical conditions, it was effective against most of the aphides tried, and against the caterpillars of *Autographa brassicae*, *Datana ministra*, *Asinota senatoria*, *Malacosoma americana* and the larvae of *Leptinotarsa decemlineata*.

148.—**The Destruction of the Rice Weevil with Chloropicrin.**—BERTRAND, G., BROCCO-ROUSSEAU and DASSONVILLE, in *Comptes rendus des seances de l'Academie des Sciences*, Vol. CLXIX, No. 19 (Nov. 10, 1919), pp. 880-882. Paris, 1919.

These investigations were made on the rice weevil (*Calandra oryzae* Ls.) which is very prevalent in maize grains.

The authors first examined the effect of poisonous vapour on the weevil outside the grain, using the same methods as in their researches on bed bugs; 560 specimens were utilized.

The authors tried to find by means of the results the conditions under which, in practice, the weevils contained in grain could be

destroyed. One hectolitre of infested maize which they used had an apparent density of 0.715 and included 62 litres of actual grain and 38 of interstitial air. If it had been necessary, in order to kill the weevils, only to vaporize the proportions of chloropicrin indicated in the annexed table, a few grammes of this substance per hectolitre would have been sufficient. The insect, however, is sheltered inside the grain and the latter holds, at least for a time, a small proportion of the poison vapour. Hence it is necessary as the experiments demonstrate, to use more chloropicrin in order to kill the weevils contained inside the grain than to kill those outside.

By varying the conditions of experiment, the authors saw that the quantities required vary appreciably according to circumstances, such as: depth of the layer of grain, duration

of contact with chloropicrin vapour, temperature, etc.

Direct treatment of the grain in bags, which is at once the most practical and difficult method, was successfully carried out in consequence of the authors' experiments: by pouring from 20 to 25 gm. of chloropicrin on to each bag lying on the ground in a closed chamber, twenty hours were long enough to ensure the death of all weevils, at a constant temperature of 10-12°C. The insects killed were almost all outside the grain; they may easily be got rid of by winnowing, and the grain may be fed to stock.

This method being very simple and effective ensures at once and at the same time the destruction of the insects which manage to get out of the grain and hide in cracks of the wall or floors in the chamber where the treatment is carried out.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS

The following is a brief indication of the contents of the more important articles in the November, 1920, number of the Institute Economic Bulletin. Persons interested in any of the articles may obtain the original Bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

Co-operative Dairies in Germany during the War.—18 pages. Gives an account of the general conditions of these dairies during the war, their liabilities and assets, work, and financial results.

The Operations of the United States Federal Farm Loan Board in 1919.—15 pages. This article, which is based on the third annual report of the Federal Farm Loan Board, discusses the subject under the following heads: number and operations of the joint-stock land banks; appraisal system; national farm loan associations; land speculation;

earnings of banks; purposes of loans; corroboration of appraisements; general assistance to agriculture; proposed amendments; service as agents of the Government.

The Increase in Agricultural Wages in France, from 1915 to 1920.—17 pages.

New Tendencies in the Recent Changes in Agricultural Agreements in Italy.—8 pages. Discusses the vocational organization of the peasants, the demand for higher remuneration, the desire of the peasantry to control the management of the land, and the action of the State.

Some of the shorter articles are: The Development of Co-operative Distribution Societies in Country Districts in France; Co-operative Dairies in Sweden in 1918; The Swiss Central Butter Control; The Large Mutual Live Stock Insurance Companies in France in 1919; Mutual Agricultural Insurance Societies in Italy.

AGRICULTURAL STATISTICS

THE CROPS OF 1920—WORLD'S WHEAT AND LIVE STOCK SITUATION

BY T. K. DOHERTY

THE prices of cereals have fallen very rapidly since the middle of 1920 and now approximate the prices being paid for other commodities. During a certain period of the war cereal prices maintained a certain margin of advantage. In 1914 and again in 1916 there was an agreement between them, but in the interval between 1916 and the close of 1920, the prices of wheat were higher than those of commodities, and the margin was quite important in the early part of 1917 and the earlier part of 1920. The high cost of production of the crops of 1920, together with the rapid decline of prices latterly, in some cases even to a point below the cost of production, are factors which bear very rapidly on the producers. The producers are therefore interested in having as much information as possible on the actual situation. The purpose of this article is to give this information as fully as possible in regard to all the chief farm crops and live stock, with some particular attention to the wheat crop, concerning which so much more information is available.

Before entering into details in regard to wheat in particular, it is well to recall the very violent fluctuations in the price of wheat in England during the Napoleonic wars and in the years following the conclusion of peace in 1815. The following table contains these prices year by year from 1800 to 1822:

1800.....	\$	3 47
1801.....		3 62
1802.....		2 13
1803.....		1 80
1804.....		1 89
1805.....		2 74
1806.....		2 40
1807.....		2 28
1808.....		2 47
1809.....		2 95
1810.....		3 22
1811.....		2 91
1812.....		3 84
1813.....		3 34
1814.....		2 27
1815.....		2 01
1816.....		2 38
1817.....		2 92
1818.....		2 62
1819.....		2 27
1820.....		2 07
1821.....		1 71
1822.....		1 37

The high prices culminated in 1812 at \$3.84 a bushel, when the Duke of Wellington was fighting Napoleon in Spain and our own war with the United States had started. With the failure of the French invasion of

Russia in 1812 there was an extreme decrease of price to \$2.01 in 1815 until the battle of Waterloo, when a rise started which reached \$2.92 in 1817, then subsided gradually during the next five years so that it reached the lowest price of \$1.37 in 1822. This course of wheat prices at that time represents somewhat of an index to the prices of other grains and commodities. Our own markets have during the war paralleled the situation to some extent. They have paralleled it for the couple of years following peace, when our high prices coincided with those which prevailed in 1816, 1817, and 1818. At the present time, however the decline in the price of wheat has been much more rapid and considerable than in the years following Napoleon's final defeat. However, the present decline may be overdone, and we may still witness a further coincidence with the post Napoleonic period.

In order to arrive at a satisfactory understanding of the present situation it will be well to examine the original statistical data furnished for the most part by the International Institute of Agriculture, and supplemented from other reliable commercial agencies. In the following pages will be presented:

(1) A series of tables giving for 1919 and 1920 and the average of 1914-18 the acreage and production of wheat, rye, barley, oats, corn, rice, flaxseed and fibre, potatoes and sugarbeets. The figures in these tables are all furnished by the different Governments. The totals have not been given, because the official figures for certain countries for certain years have not been received. The new countries that have resulted from the Peace Treaty are chiefly the ones in which deficiencies exist.

(2) There is presented a table giving the world's production of wheat by countries for 1919 and 1920 compared with the pre-war average.

(3) A table giving the exports of wheat by exporting countries from 1913-14 to 1919-20 and the pre-war five-year average.

(4) A table giving the monthly exports of wheat and flour by the United States and Canada.

(5) The imports of wheat by Great Britain, France, Italy, and Belgium for August, September, and October, 1920.

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(6) Broomhall's estimated requirements of importing countries for the current season, with comment.

(7) Estimates of supply and demand situation with regard to wheat.

(8) Tables giving the numbers of cattle, sheep and swine in different countries.

Table 1

WHEAT

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	3,427	3,161	4,064	78,925	79,702	111,550
Belgium.....	282	329		7,949	9,895	7,935
Bulgaria.....	2,154	2,080	2,415	41,190	34,029	29,308
Denmark.....	165	125	144	6,945	5,923	6,088
Spain.....	10,050	10,378	10,086	134,457	129,251	137,221
Jugo-Slavia.....	3,952	3,380		64,712	50,956	
Finland.....	19	19	18	272	306	229
France.....	11,995	11,376	12,464	230,406	182,446	214,139
England and Wales.....	1,875	2,221	2,073	53,416	63,808	64,483
Scotland.....	54	79	68	2,080	3,064	2,687
Ireland.....	50	70	96		2,452	3,549
Greece.....		936		13,288	9,693	
Hungary.....	2,081			29,139		
Italy.....	11,292	10,592	11,462	141,338	169,771	167,991
Norway.....	41	41	20	1,035	1,071	477
Netherlands.....	156	168	143	6,677	5,763	5,320
Poland.....		1,064		18,258	15,754	
Roumania.....	2,072	2,965	4,690	24,001	48,492	58,263
Bessarabia.....	1,353	1,273	1,707	17,815	16,988	18,569
Bukovina.....	26	33			580	
Transylvania.....	1,704					
Sweden.....	360	348	326	11,133	9,509	8,707
Switzerland.....	119	130	130	3,586	3,524	4,205
Czecho-Slovakia.....	1,494			24,453		
Canada.....	18,232	19,126	14,576	263,189	193,260	248,084
United States.....	57,192	72,308	54,119	787,128	934,265	822,246
Guatemala.....	24	21	27	312	251	632
India.....	29,975 ^a	23,797	31,941	376,768	280,299	352,986
Japan.....	1,335	1,344	1,297	29,477	30,676	27,802
Algeria.....	2,647	2,800	3,251	8,929	19,166	33,191
Egypt.....	1,190	1,323	1,349	31,711	30,137	34,186
Morocco.....	1,974	1,551	1,551	17,637		18,654
Tunis.....	1,211	1,400	1,378	4,766	6,981	7,047

^a It is estimated that there has been a decrease in area in the 1921 crop of about 4,000,000 acres.

Table 2

RYE

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	10,703	10,842	14,748	189,558	240,163	341,188
Belgium.....	506	496		13,701	13,681	11,093
Bulgaria.....	417	446	480	8,931	6,490	5,800
Denmark.....	519	559	518	12,614	14,909	11,366
Spain.....	1,920	1,808	1,835	32,053	23,297	26,697
Jugo-Slavia.....	948	682		18,125	9,816	
Finland.....	602	602	584	9,173	10,505	9,990
France.....	2,000	1,907	2,130	33,174	28,736	32,794
England and Wales.....	96	107	63			
Scotland.....	7	6				
Ireland.....	6	5	7		143	219
Greece.....		58		1,307	1,081	
Hungary.....	1,248			16,520		
Italy.....	282	273	286	4,539	4,571	4,931
Norway.....	37	37	46	990	983	1,179
Netherlands.....	489	497	509	14,223	14,493	13,301
Poland.....		6,545		74,842	103,044	
Roumania.....	182	219	191	1,972	3,430	1,890
Bessarabia.....	275	482	445	3,778	5,890	4,632
Bukovina.....	35	47			726	
Transylvania.....	190					
Sweden.....	914	920	921	24,959	23,073	21,092
Switzerland.....	50	55	58	1,622	1,575	1,676
Czecho-Slovakia.....	2,185			33,439		
Canada.....	650	753	230	11,306	10,207	3,948
United States.....	5,043	7,103	3,918	69,318	88,909	59,932

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BARLEY

Table 3

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	3,273	3,081	3,652	87,742	111,115	
Belgium.....	87	75		3,842	3,617	
Bulgaria.....	502	474	587	12,511	10,371	10,048
Denmark.....	585	569	603	23,548	24,522	22,987
Spain.....	4,265	4,254	3,858	89,146	81,809	82,071
Jugo-Slavia.....	1,182			20,654		
Finland.....	293	293	283	4,983	5,295	4,527
France.....	1,495	1,387	1,593	35,400	22,964	35,923
England and Wales.....	1,637	1,510	1,406	52,800	45,617	46,242
Scotland.....	204	174	165	8,108	6,367	6,373
Ireland.....	208	187	165		8,125	7,346
Greece.....		300		7,183	5,020	
Hungary.....	1,201			20,045		
Italy.....	494	480	552	5,870	8,327	9,037
Norway.....	156	156	111	5,427	5,275	3,729
Netherlands.....	56	57	60	2,846	2,387	2,718
Poland.....		1,315		39,309	27,843	
Roumania.....	1,116	587	1,210	21,701	11,797	21,484
Bessarabia.....	1,837	1,297	1,819	26,483	18,875	21,462
Bukovina.....	47	58			969	
Transylvania.....	308					
Sweden.....	402	412	429	11,115	12,892	12,538
Switzerland.....	18	19	18	620	625	617
Czecho-Slovakia.....	1,695			38,618		
Canada.....	2,552	2,646	2,112	63,311	56,389	53,067
United States.....	8,083	7,198	8,229	202,024	161,345	214,819
Japan.....	2,691	2,893	3,066	95,840	95,339	94,746
Algeria.....	2,444	2,640	2,896	9,526	25,538	40,108
Egypt.....	340	357	426	7,475	10,087	12,296
Morocco.....	1,903	1,523	1,970	30,314		32,143
Tunis.....	939	1,105	1,145	3,169	5,512	7,918

OATS

Table 4

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	8,006	7,240	9,430	291,380	388,719	
Belgium.....	537	550		26,237	25,337	
Bulgaria.....	319	301	364	9,159	6,953	6,330
Denmark.....	1,001	961	1,008	44,494	44,786	43,379
Spain.....	1,574	1,595	1,402	37,294	30,979	30,847
Jugo-Slavia.....	1,036			26,916		
Finland.....	1,013	1,013	969	23,116	22,714	23,663
France.....	8,065	7,055	7,748	273,814	161,688	230,546
England and Wales.....	2,264	2,564	2,228	98,739	104,768	102,056
Scotland.....	1,032	1,111	1,035	47,323	48,681	47,600
Ireland.....	1,331	1,442	1,246		80,508	73,469
Greece.....		155		3,761	3,884	
Hungary.....	836			21,761		
Italy.....	1,159	1,129	1,169	22,798	32,654	30,793
Norway.....	343	343	314	14,262	14,217	13,951
Netherlands.....	392	389	365	22,857	19,446	19,858
Poland.....		2,441		104,922	71,795	
Roumania.....	1,136	597	1,001	28,453	13,433	20,986
Bessarabia.....	281	305	231	6,565	6,931	4,652
Bukovina.....	46	49			1,117	
Transylvania.....	590					
Sweden.....	1,758	1,762	1,911	62,313	72,087	65,205
Switzerland.....	56	57	79	2,931	2,607	4,575
Czecho-Slovakia.....	1,947			52,594		
Canada.....	15,850	14,952	12,150	530,710	394,387	403,513
United States.....	43,323	41,835	41,773	1,526,055	1,231,754	1,414,558
Japan.....	282	218	147	10,506	8,715	5,899
Algeria.....	576	533	594	4,761	10,008	14,495
Morocco.....	6	7	6			165
Tunis.....	124	135	145	1,427	2,918	3,046

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Table 5

CORN

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Bulgaria . . .	1,419	1,392	1,458	39,650		20,797
Spain . . .	1,167	1,179	1,158	27,377	25,555	28,315
Yugo-Slavia . . .	3,018			86,556		
France . . .	792	736	909		9,976	16,187
Hungary . . .	1,894			48,320		
Italy . . .	3,707	3,709	3,826	86,610	85,846	93,888
Poland . . .				1,527		
Roumania . . .	4,831	4,862	4,903	71,701	102,229	75,643
Bessarabia . . .	1,264	1,727	1,686	21,250	32,022	26,082
Bukovina . . .	89	162			3,162	
Transylvania . . .	1,146					
Switzerland . . .	6	6	4	280	287	209
Czecho-Slovakia . . .	292			6,299		
Canada . . .	292	265	233	14,335	16,941	11,308
United States . . .	104,601	100,072	107,225	3,232,367	2,858,509	2,760,484
Guatemala . . .	553	674	599	4,062	4,939	9,398
Indo-China . . .	400		344	5,733		6,286
Japan . . .	139	136	143			3,834
Algeria . . .	22	15		253	236	
Morocco . . .	292		435	2,858		3,854
Tunis . . .	30	45	45	197	256	229

Table 6

RICE

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Bulgaria.....	8	4	8	297	118	208
Spain.....	120	112	103	13,956	14,832	11,454
Italy.....	284	325	351	21,070	23,848	26,220
United States.....	1,337	1,092	893	53,710	42,790	33,360
Guatemala.....	6	14	24	80	187	472
India.....	72,820	78,391	78,604		2,740,678	2,395,349
Indo-China.....	11,761		10,151	226,254		284,541
Japan.....		7,608	7,518	550,703	538,911	497,354
Egypt.....	140	150	237	22,814	21,851	14,554

FLAX

Table 7

(a) *Seed*

(b) *Fibre*

Countries	Area Thousands of acres			Production Seed, thousand bushels Fibre, thousand pounds		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Belgium.....	121	48		(a) 886 (b) 76,654	407 29,983	
Bulgaria.....	1		1	(a) 13 (b) 551		
Spain.....	2	2	3	(a) 52 (b) 705	42 970	
Finland.....	14					
France.....	61	38	27	(a) (b)	339 21,671	196 13,779
England and Wales.....	22	19	5			
Scotland.....	2	1				
Ireland.....	127	96	89	(a) (b) 354	30,732 433	28,373 361
Italy.....	44	47	43	(b) 5,512 (b) 26,918	5,291 11,354	5,335 13,448
Netherlands.....	53	24	24	(a) 106 (b) (b) (a) (b) 50	196 992 100 375	182 2,579 91
Roumania.....	24	31	60	(a) (b) (a) (b) 926	8 926	
Bessarabia.....	6	17	9			
Bukovina.....				(a) (b) (a) (b) 926	8 926	
Sweden.....	7					
Czecho-Slovakia.....	54					
Canada.....	1,428	1,093	838	(a) 7,998 (a) 10,990	5,473 7,661	6,708 12,922
United States..	1,785	1,572	1,680	(a) 17,320 (a) 7 (a) 7 (a) 108	9,400 7 7 57	18,400 7 7 57
India.....	3,100	1,989	3,410	(a) 7 (a) 7 (a) 108	9,400 7 7 57	18,400 7 7 57
Algeria.....	1	1	1	(a) 7 (a) 7 (a) 108	9,400 7 7 57	18,400 7 7 57
Egypt.....	6	3	2	(a) 7 (a) 7 (a) 108	9,400 7 7 57	18,400 7 7 57
Tunis.....	7	8	6	(a) 7 (a) 7 (a) 108	9,400 7 7 57	18,400 7 7 57

THE AGRICULTURAL GAZETTE OF CANADA

POTATOES

Table 8

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	6,054	5,387	7,291	.....	788,123	1,367,993
Belgium.....	331	319	.....	57,095	76,065	.....
Bulgaria.....	15	.....	.....	2,023	.....	.....
Denmark.....	216	226	160	.....	53,087	34,283
Spain.....	1,166	805	731	104,762	101,020	99,903
Yugo-Slavia.....	349	.....	.....	38,452	.....	.....
Finland.....	208	204	201	17,865	17,718	17,723
France.....	3,332	3,104	3,298	.....	284,049	346,123
England and Wales.....	545	475	499	117,115	102,032	118,457
Scotland.....	162	155	149	46,181	31,061	36,151
Ireland.....	584	589	635	74,141	102,539	131,452
Hungary.....	622	.....	.....	71,569	.....	.....
Italy.....	741	763	730	51,441	50,989	54,414
Norway.....	132	132	122	30,811	37,912	28,425
Netherlands.....	421	445	431	91,304	105,317	102,164
Roumania.....	35	70	79	.....	2,832	3,429
Bessarabia.....	36	39	45	3,226	2,916	3,984
Bukovina.....	47	71	.....	.....	5,096	.....
Transylvania.....	130	.....	.....	.....	.....	.....
Sweden.....	366	417	385	60,260	77,574	66,951
Switzerland.....	123	136	132	28,256	27,925	28,219
Czecho-Slovakia.....	1,512	.....	.....	.....	.....	.....
Canada.....	785	819	565	133,831	125,575	78,712
United States.....	3,929	3,952	3,938	430,458	357,907	382,113
Guatemala.....	2	6	.....	96	694	.....
Japan.....	334	344	261	47,278	67,236	39,656
Algeria.....	43	44	.....	985	.....	.....
Tunis.....	3	2	1	.....	138	117

SUGAR BEETS

Table 9

Countries	Area Thousands of acres			Production (Thousands of tons (2,000 lb.))		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	811	744	1,008	.....	6,413	11,685
Belgium.....	124	112	.....	1,774	793	.....
Bulgaria.....	16	.....	.....	133	.....	.....
Denmark.....	95	102	80	.....	1,120	960
Spain.....	184	133	126	1,731	1,160	1,115
Finland.....	2	1	.....	11	9	.....
France.....	202	165	214	.....	1,194	2,204
England and Wales.....	3	1	1	.....	.....	.....
Hungary.....	82	.....	.....	675	.....	.....
Italy.....	124	106	114	1,653	1,651	1,408
Netherlands.....	157	131	133	2,281	1,647	1,792
Roumania.....	8	5	29	.....	31	168
Bessarabia.....	1	3	2	1	6	.....
Bukovina.....	.....	.....	.....	.....	1	.....
Transylvania.....	5	.....	.....	.....	.....	.....
Sweden.....	108	90	81	1,124	1,031	968
Switzerland.....	1	1	1	10	11	22
Czecho-Slovakia.....	523	.....	.....	.....	.....	.....
Canada.....	36	25	15	412	240	123
United States.....	882	692	604	8,545	6,421	6,051

THE AGRICULTURAL GAZETTE OF CANADA

WORLD'S PRODUCTION OF WHEAT

Countries	1920	1919	Five years' pre-war average 1909-13
	Bushels	Bushels	Bushels
<i>North America—</i>			
Canada.....	263,189,000	193,260,000	197,118,000
United States.....	787,128,000	934,265,000	686,697,000
Mexico.....	10,000,000 ^a	10,000,000	8,000,000
Guatemala.....	312,000	251,000	632,000
Total North America.....	1,060,629,000	1,137,776,000	892,447,000
<i>South America—</i>			
Argentina.....	184,000,000	214,142,000	148,908,000
Chili.....	14,000,000 ^a	12,000,000	14,000,000
Uruguay.....	6,000,000 ^a	5,416,000	6,519,000
Total South America.....	204,000,000	231,558,000	169,427,000
<i>Australasia—</i>			
Australia.....	149,000,000 ^b	44,001,000	90,500,000
New Zealand.....	7,000,000 ^a	4,005,000	7,070,000
Total Australasia.....	156,000,000	48,006,000	97,570,000
<i>Africa—</i>			
Algeria.....	8,929,000	19,166,000	34,998,000
Egypt.....	31,711,000	30,137,000	34,121,000
Tunis.....	4,766,000	6,981,000	6,230,000
South Africa.....	8,650,000	6,630,000	6,520,000
Total Africa.....	54,056,000	62,914,000	81,869,000
<i>Asia—</i>			
India.....	376,768,000	280,299,000	359,035,000
Japan.....	29,468,000	30,676,000	24,166,000
Korea.....	7,000,000	7,144,000	5,922,000
Persia.....	13,000,000 ^a	13,000,000	13,600,000
Total Asia.....	426,236,000	331,119,000	402,723,000
<i>Europe—</i>			
Great Britain and Ireland.....	57,000,000 ^c	69,324,000	59,640,000
France.....	230,406,000	182,446,000	317,639,000
Italy.....	141,338,000	169,771,000	183,336,000
Belgium.....	7,949,000	9,895,000	14,894,000
Netherlands.....	6,677,000	6,015,000	4,896,000
Denmark.....	6,945,000	5,923,000	5,344,000
Norway.....	1,035,000	1,071,000	306,000
Sweden.....	11,123,000	9,509,000	8,103,000
Switzerland.....	3,586,000	3,524,000	3,314,000
Spain.....	134,457,000	129,251,000	130,447,000
Portugal.....	5,000,000 ^a	6,400,000 ^a	7,440,000
Greece.....	13,288,000	9,693,000	9,400,000 ^d
Bulgaria.....	41,190,000	34,029,000	29,308,000 ^d
Jugo-Slavia.....	64,712,000	50,956,000	.....
Roumania.....	24,000,000	48,492,000	57,896,000 ^d
Bessarabia.....	17,815,000	16,988,000	18,569,000 ^d
Czecho-Slovakia.....	24,436,000	15,051,000	23,541,000 ^e
Germany.....	78,925,000	79,700,000	113,100,000 ^d
Total Europe (less Jugo-Slavia).....	805,170,000	797,082,000	987,173,000
World's Total.....	2,706,091,000	2,608,455,000	2,631,209,000

(a) Estimates based on condition reports.

(b) Broomhall's estimate.

(c) Official for England and Wales, and Ireland, estimated for Scotland.

(d) Average 1914-18.

(e) Year 1914.

WHEAT AND FLOUR
Exports of Exporting Countries During the Grain Years August 1st to July 31st.
(Calendar Years for Argentina and Australia.)

Table L.

Countries	Average 5 years 1908-09 to 1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	1919-20
Canada.....	Bushels 80,058,000	Bushels 135,589,000	Bushels 86,756,000	Bushels 269,162,000	Bushels 174,409,000	Bushels 169,242,000	Bushels 103,613,000	Bushels 92,499,000
United States.....	99,620,000	162,800,000	313,861,000	242,020,000	201,423,000	135,324,000	289,909,000	240,647,000
India.....	48,860,000	33,475,000	37,202,000	8,604,000	56,222,000	39,882,000	.....	.....
Algeria.....	5,510,000	5,671,000	4,762,000	5,744,000	3,877,000	2,060,000	.....	.....
Russia.....	151,787,000	170,122,000	7,585,000	13,782,000	7,552,000	.....	.....	.....
Roumania.....	51,566,000	51,855,000	4,007,000	22,632,000	.....	.....	.....	.....
Argentina.....	1909-13 95,716,000	1914 38,984,000	1915 94,967,000	1916 86,038,000	1917 37,829,000	1918 115,110,000	1919 127,142,000	1920 184,600,000
Australia.....	49,673,000	60,878,000	1,806,000	56,037,000	63,231,000	38,972,000	109,537,000	49,132,000

In the above table figures for calendar years, which do not coincide with our grain years, were given for the Southern countries. In the grain year 1918-19 Argentina exported 83,000,000 bushels and Australia 73,000,000 bushels. In 1919-20 Argentina exported 265,000,000 bushels and Australia 99,000,000.

THE AGRICULTURAL GAZETTE OF CANADA

MONTHLY EXPORTS OF WHEAT AND FLOUR FROM CANADA AND THE UNITED STATES

Table 13

Months	Canada	United States
	Bushels	Bushels
1919-20		
August	9,562,000	20,310,000
September.....	4,247,000	24,816,000
October.....	6,454,000	20,979,000
November.....	12,138,000	23,396,000
December.....	13,205,000	15,427,000
January.....	12,299,000	12,271,000
February.....	7,615,000	10,581,000
March.....	5,915,000	16,881,000
April.....	2,493,000	13,722,000
May.....	2,755,000	25,885,000
June.....	7,950,000	21,754,000
July.....	7,878,000	34,655,000
Total for grain year	92,511,000	240,677,000
1920-21		
August.....	6,065,000	32,550,000
September.....	5,321,000	34,994,000
October.....	19,114,000	43,033,000
November.....	29,483,000	30,989,000
December.....	37,468,000	30,179,000
January.....	14,612,000	27,105,000

EXPORTS OF WHEAT AND FLOUR FROM CANADA DURING GRAIN YEARS ENDING JULY 31

(Flour expressed in equivalent quantities of wheat)

Table 14

Year	Bushels
1898-99 (a)	13,872,000
1903-04 (a)	30,031,000
1908-09	56,735,000
1913-14	135,589,000
1914-15	86,756,000
1915-16	269,162,000
1916-17	174,565,000
1917-18	169,040,000
1918-19	103,611,000
1919-20	92,511,000

(a) Year ending June 30.

Table 15. IMPORTS OF WHEAT AND FLOUR—(THOUSANDS OF BUSHELS)

Months	Great Britain and Ireland			France			Italy			Belgium		
	Wheat	Flour	Total	Wheat	Flour	Total	Wheat	Flour	Total	Wheat	Flour	Total
Total 1919-20, August 1st to July 31st	179,270	33,382	212,552	73,807	14,978	88,785	78,395	7,559	85,945	21,092	1,395	22,488
August	22,335	3,382	25,717	11,630	620	12,250	6,109	21	6,223	4,581	26	4,610
September	27,152	2,055	29,207	8,280	5	8,285	8,386	546	8,922	1,601	15	1,616
October	21,387	2,805	24,192	.....	.....	.....	5,485	15	5,500	1,433	7	1,440

THE AGRICULTURAL GAZETTE OF CANADA

WHEAT AND FLOUR.

Broomhall's Estimates of Requirements of
Importing Countries for Current
Season.
(February 1, 1921)

"The general international statistical position of wheat has undergone no alteration

in the past week, and remains favourable for buyers. The shipments to Europe for the first half of the season totals 252,000,000 bushels, and to ex-Europe 20,000,000 bushels (these quantities include estimated Manchurian shipments), the grand total being 272,000,000 bushels."

Table 16

Countries	Season 1920-21 Aug. 1 to July 31	Still required Feb. 1 to July 31
	Bushels	Bushels
United Kingdom.....	208,000,000	92,000,000
France.....	64,000,000	32,000,000
Italy.....	80,000,000	40,000,000
Spain.....	16,000,000	4,000,000
Portugal.....	4,000,000	2,400,000
Greece.....	8,000,000	4,000,000
Belgium.....	48,000,000	24,000,000
Germany.....	48,000,000	24,000,000
Holland, Switzerland, Norway, Sweden and Denmark.....	32,000,000	24,000,000
Austria, Czecho-Slovakia and Poland.....	16,000,000	8,000,000
Total Europe.....	524,000,000	254,400,000
Ex Europe.....	48,000,000	28,000,000
Grand Total.....	572,000,000	282,400,000

With reference to the above estimates we wish to point out that both the United Kingdom and France have already imported freely, partly from floating supplies, but we have reckoned a full quantity for the latter country for the ensuing six months, because it was recently announced that purchases of 72,000,000 bushels of wheat and rye for this season had been authorized, and we are inclined to think that some of the imports declared for last August were really imported in the previous season. The Italian consumption in the four months, August-November, was very light, but we think the basis is too narrow to warrant the assumption that the season's total will be correspondingly reduced. There are some indications that Austria, Poland and Czecho-Slovakia may take larger quantities in the near future, but it is evident that the supply problem for these countries is a very difficult one."

So much for Mr. Broomhall's estimates of the world's requirements and his comments thereon. The figures for European countries coincide with those estimated in our article in the "Agricultural Gazette" for August,

1920 (p. 721). We now think that the estimate made at that time of 70,000,000 bushels for requirements outside of Europe is more probably correct than Mr. Broomhall's estimate of 48,000,000. Broomhall's pre-war estimate of requirements outside of Europe was generally from 90 to 98 million bushels. In the current year, of these total outside estimated needs of 70,000,000 bushels, Brazil will probably take 25,000,000 bushels from Argentina, and the Mediterranean countries, not mentioned in Mr. Broomhall's statement and whose crop suffered from drought last season, together with the armies operating close to the Mediterranean, will probably take an additional 20,000,000 bushels. A large number of other small tropical States that do not furnish official reports of their imports will, we believe, account for the additional 25,000,000 bushels. It is not, therefore, improbable that the world's requirements will be about 594,000,000 bushels or even 600,000,000 bushels. Against these requirements there will be available some 605,000,000 bushels. The details of the supply situation are estimated in the next table:—

THE AGRICULTURAL GAZETTE OF CANADA

Table 17

	Carry-over August 1, 1920	Production 1920	Home Needs	Probable Export	Carry-over August 1, 1921
	Thousand Bushels	Thousand Bushels	Thousand Bushels	Thousand Bushels	Thousand Bushels
Canada.....	10,000	263,189	93,000	170,000	10,000
United States.....	124,000	787,128	625,000	240,000	46,000
Argentina.....	17,963	184,000*	82,000	90,000	30,000
Australia.....	16,000	149,000*	55,000	90,000	20,000
India.....	6,000	376,768	330,000	15,000	37,000
	173,963	1,760,085	1,185,000	605,000	143,000

* 1920-21.

Argentina and Australia are not likely to export anywhere near their total available surpluses during the seven months from harvest to August 1 next. Their carry-over will no doubt be considerable, and this carry-over will come into competition with the North American crop. In the case of India a very large proportion of the surplus is likely to be retained at home to compensate for the under-average crop expected in March and April next from an area four million acres smaller than in 1920. The estimated data in the table are of value only inasmuch as they indicate what adjustment may occur as between demand and supply if some unexpected factors do not appear. Among these factors will be the possibility of trade relations being concluded with the Russian Government, also the possibility of moderate exports from the Ukraine and Balkan States. If these factors be excluded the present supplies of wheat do not appear so excessive as to justify the recent very severe decline in prices. The adverse exchange and the lengthening of the milling extraction of wheat to 80% in the European countries are unfavourable factors, but any indication of serious impairment of the winter crops, say, of the United States crop, would quickly reverse the downward tendency. Last year's world's crop was coincidentally large in a number of the chief exporting countries. The average was exceeded notably in India, Australia, and even Argentina, not to mention North America.

It is encouraging to bear in mind a statement in the last issue of the "Gazette" (p. 99) as to the increased world's tonnage now available, namely 60,000,000 tons, as compared with 45,000,000 tons before the war, also the recent report that a large portion of that tonnage is idle. Lower freights will mean a larger share of the selling price to be divided between the producer and the consumer.

The world's acreage in wheat as compared with the pre-war average does not show a striking difference. In the "Gazette" of

August, 1919 (p. 776) the comparative acreages were given. Excluding Russia the totals for 1919 were 201 million acres against 186 million pre-war, an increase of 15 million. But the decrease of acreage in the United States in 1920 (57 million compared with 72 million in 1919) was only a little less than that decrease. From our present table No. 1 there appear decreases for France, Hungary, Roumania, Germany, Bulgaria and Italy of about 11 million acres, as compared with the pre-war average. On the other hand Canada exhibits an increase of 8,287,000, and the United States of 10,095,000. Then the United States, as we have just said, had 15 million acres less than in 1919. There may be evidence here that patriotism and high prices have stimulated too great a specialization in wheat as compared with other agricultural enterprises.

It is noticeable, from Tables No. 1-4 that Germany's acreage as well as production has decreased for all crops. The data for 1919 and 1920 are for practical purposes comparable with the average of 1914-18, although the latter may comprise the relatively unimportant figures for that part of Silesia which has gone to Poland. The data for Alsace and Lorraine are excluded in both cases. The decreases shown for the acreage and production of rye and potatoes is striking, and would indicate a present shortage of the foods upon which the people chiefly relied before and during the war.

On the other hand France is rapidly regaining her former position in area and production of all crops. She has already exceeded her 1914-18 average in area and production of oats, flaxseed and fibre and potatoes. Great Britain and Ireland has lost some in wheat and rye, but has gained in all the other products. Italy has maintained her acreage very well, although she has suffered some in production especially of wheat. Canada shows up well in the increase of all crops. Canada has made notable progress in wheat, and has, for the same two periods, increased her acreage in rye from 230,000 to 650,000; in oats from 12,150,000 to 15,850,000

in flaxseed from 838,000 to 1,428,000; in potatoes from 565,000 to 785,000; in sugarbeets from 15,000 to 36,000. The increases would be much more striking if the comparison were made between 1920 and the pre-war five-year average.

In the world's production of wheat by continents, excluding Russia, shown in Table No. 10, the grand total for 1920 is 74,882,000 in excess of that for the pre-war average, and 97,636,000 in excess of that for 1919. That increase is accounted for nearly altogether by the Indian crop of 1920, which was nearly 100,000,000 above that of 1919. However, the light acreage and drought of the current season in India compels withholding most of the surplus from the market, so that for practical purposes it may be assumed that the world's production of 1920 was about equal to that of the preceding year and equal to the pre-war five-year average. That average was fairly high because 1912 and 1913 were years of abundant production, although the big surpluses of the 1913 crop were readily absorbed during the first year of the war.

In the totals of production by continents in Table No. 10, for the same periods, it may be noticed that while in 1920 Europe's total is 182 million bushels below pre-war average North America's is 168 million above it. South America, Australia and Asia all show comparative increases of more or less importance.

With reference to Tables Nos. 12, 13 and 14 it is to be observed that our production, on an increased acreage in the last couple of years preceding the current one, has not enabled Canada to export an amount of wheat much in excess of our average exports during the pre-war period, while the United States has exported two and a half times as much. Climatic conditions favoured the United States but reduction of their acreage which, for the winter crop sown last fall, amounted to 1,152,000 acres, might with lower prices extend to the spring-sown wheat. Should unfavourable climatic conditions develop later the result might leave but little for export. The world's situation and the tendency towards reduction of acreage in the United States would scarcely justify a great reduction in Canada's acreage, although the world's live-stock situation, shown in Table No. 18, indicates the general strength of this situation and offers a strong argument for mixed farming.

The monthly export figures (Table 13) show in the first five months of the current year that the United States have rushed a great deal of wheat to market in a short time. If the official figures of carry-over from the old crop and the production of 1920 are correct their exports cannot continue at anything like the same rate. From data so

far to hand it appears that Canada has, apart from shipments in bond through United States ports, exported to the United States 20 million bushels in the months of September, October and November. The bulk of this lost its identity and was no doubt shipped out in the form of wheat or flour by the United States and credited on their domestic wheat exports. This is a species of duplication which does not occur in Canada.

Table 15—imports of wheat and flour by European countries—gives results only for the first three months of the current grain year. But it is noticeable that Britain's average monthly import is over 25,000,000 bushels. This fact is a pretty forceful commentary on a statement recently made by Mr. Julius H. Barnes, former United States Wheat Director and President of the United States Grain Corporation. In Chicago on November 5 last, before a committee of seventeen representing farmers' organizations appointed to consider grain marketing problems, Mr. Barnes spoke as follows:

"For instance, the largest overseas buyer, whose normal requirements run to practically one-half the overseas purchases of wheat, has bought not a bushel in America since July 29—over three months ago—their policy directed by Governmental consideration which would not have affected the usual import merchants abroad. They have abstained from purchasing during the period of crop pressure here and in Canada. Fortunately there has not been concerted action among all the Governments, and other importing countries have continued current purchases to a large amount. This particular importer has been able so to abstain because of large purchases made in America last May, June and July, providing an enormous advance stock, which has carried them through these months and may for some time longer. This is a total deflection of the operation of supply and demand as usually interpreted by commercial judgment. The merchant opinion of the world, freely operating, would never have dared accumulate such a supply of high-priced wheat and there would never have been thus established the price level recorded last May and June, for nothing in the usual factors of supply and demand justified such urgent purchasing."

That is indeed an interesting statement, but it is well to mention that not only did Britain's imports for August, September and October amount to over 79 million bushels, but during May, June and July they were only 58 million, being respectively 14, 20 and 24 million bushels.

Our information is that during April, May, June and July the Government Commissions

not only of Great Britain but of the leading European countries entered into aggressive competition for American supplies, and drove prices to a scarcity level, so that the prices at New York during these months ranged over \$3.00 a bushel. The outside world took from North America in the six months July-December last more wheat and flour than in any other corresponding period, namely 311,729,000 bushels, of which 206,400,000 was American and 105,329,000 Canadian. No doubt the buying which Mr. Barnes refers to was contracts for future delivery. Of the American wheat some 40,000,000 bushels probably represented imported Canadian wheat, which was subsequently exported on American account, so the total of 311 million may be to that extent excessive.

There have been recently published illuminating articles on the wheat situation, both domestic and foreign, in the leading agricultural press. Two Canadian contributions are particularly creditable and useful. They are: "Statistical and Commentary Review of the Live Stock Market and Trade Situation during 1920", issued in mimeograph form by the Dominion Live Stock Branch of the Department of Agriculture, and two articles published in the Winnipeg Grain Trade News and Live Stock Journal of February 3 and 11 by Mr. W. Sanford Evans, entitled, respectively, "Wheat Prices Compared with General Prices" and "Effect on Wheat Prices of Quantity Produced", both illustrated by excellent charts. To those desirous of making a serious study of actual condition we cannot too strongly recommend a careful perusal of such well considered and ably presented statements.

THE WORLD'S LIVE STOCK.

CATTLE

Table 18.

Countries.	Recent estimates			Before the war		Difference between pre-war and latest estimates	
	Date	Number	Date	Number	Date	Increase	Decrease
Great Britain.....	June, 1920	6,711,209	June, 1919	7,424,177	June, 1914	7,132,860	421,651
Ireland.....	June, 1920	5,019,837	June, 1919	5,029,350	June, 1914	5,081,645	51,808
France.....	June, 1920	5,019,837	Dec. 1919	12,373,660	Dec. 1913	14,787,710	2,414,050
Italy.....	June, 1920	5,019,837	Apr. 1918	6,239,741	June, 1914	6,640,000	400,259
Spain.....	June, 1920	5,019,837	Dec. 1917	3,233,200	Dec. 1913	2,878,856	354,344
Norway.....	June, 1920	5,019,837	June 1918	1,037,817	Sept. 1914	1,146,274	108,457
Sweden.....	June, 1920	5,019,837	June 1919	2,550,828	Dec. 1913	2,722,646	171,818
Denmark.....	July, 1920	2,286,408	July, 1919	2,188,142	July, 1914	2,462,862	176,454
Netherlands.....	July, 1920	2,286,408	March, 1919	1,968,609	June, 1913	2,099,509	127,990
Belgium.....	1920	1,292,271	1919	1,151,826	Dec. 1913	1,849,484	557,213
Switzerland.....	Sept. 1920	16,904,376	April, 1919	1,433,170	April, 1911	1,443,483	10,313
Germany.....	March, 1920	740,693	Sept. 1919	16,387,796	Dec. 1913	20,994,344	4,089,968
Portugal.....	March, 1920	740,693	May, 1919	2,359,431	Oct. 1906	703,198	37,495
Czecho-Slovakia.....	.....	.....	.....	.....	1910	3,288,291	928,860
Totals.....	.....	(a)64,151,250	.....	.....	.....	73,198,252	.....
Total decrease.....	.....	9,047,022	or 12.4%	.....	.....	.....	.....
Canada.....	June, 1920	9,477,380	June, 1919	10,085,011	June, 1914	6,036,817	3,440,563
United States.....	Jan. 1921	66,191,000	Jan. 1920	68,369,000	Jan. 1914	56,592,000	9,599,000
Argentina.....	1920	27,392,126	.....	.....	June, 1914	25,866,763	1,525,363
Australia.....	.....	.....	Dec. 1918	12,738,852	Dec. 1913	11,483,882	1,254,970
New Zealand.....	Jan. 1920	3,059,445	Jan. 1919	3,035,478	April, 1911	2,020,171	1,039,274
South Africa.....	.....	.....	1919	5,575,488	1911	5,796,949	221,461
Tunis.....	.....	.....	1919	634,823	1913	217,304	417,519
Totals.....	.....	(a)125,069,114	.....	.....	.....	108,013,886	.....
Total increase.....	.....	17,035,228	or 15.6%	.....	.....	.....	.....
Increase for all countries.....	.....	8,008,206	or 4.3%	.....	.....	.....	.....

(a) Includes figures for latest date where 1920 figures are not available.

SHEEP.

Table 19.

Countries	Recent estimates			Before the war			Difference between pre-war and latest estimates	
	Date	Number	Date	Number	Date	Number	Increase	Decrease
Great Britain.....	June, 1920	19,724,779	June, 1919	21,534,349	June, 1914	24,363,396	.....	4,638,617
Ireland.....	June, 1920	3,588,892	June, 1919	3,513,345	June, 1914	3,600,581	.....	11,689
France.....	June, 1920	.....	Dec., 1919	8,990,990	Dec., 1913	16,131,390	.....	7,140,400
Italy.....	.....	.....	April, 1918	11,753,910	1914	13,824,000	.....	2,070,090
Spain.....	.....	.....	Dec., 1917	17,227,019	Dec., 1913	16,441,407	.....	.....
Norway.....	.....	.....	June, 1918	1,184,813	Sept., 1914	1,326,850	.....	142,037
Sweden.....	.....	.....	June, 1919	1,563,654	Dec., 1913	972,394	.....	.....
Denmark.....	July, 1920	504,241	July, 1919	509,466	July, 1914	514,908	.....	10,667
Netherlands.....	.....	.....	March, 1919	437,075	1913	842,018	.....	404,943
Belgium.....	.....	126,202	.....	112,112	1910	185,373	.....	59,171
Switzerland.....	.....	.....	.....	265,414	1911	161,414	.....	.....
Germany.....	Sept., 1920	6,629,813	April, 1919	5,794,382	April, 1911	5,520,837	.....	.....
Portugal.....	March, 1920	3,850,733	Sept., 1919	.....	Dec., 1913	3,072,988	.....	.....
Czecho-Slovakia.....	.....	.....	May, 1919	170,432	Oct., 1906	188,863	.....	18,431
Totals.....	.....	76,047,967	.....	.....	.....	87,146,419	.....	.....
Total decrease.....	.....	11,128,452	or 12.8%	.....	.....	.....	.....	.....
Canada.....	June, 1920	3,720,783	June, 1919	3,421,958	June, 1914	2,058,045	.....	.....
United States.....	Jan., 1921	45,067,000	Jan., 1920	47,114,000	Jan., 1914	49,719,000	.....	4,652,000
Argentina.....	.....	45,309,419	.....	.....	June, 1914	43,225,452	.....	.....
Australia.....	.....	.....	Dec., 1918	87,086,236	Dec., 1913	85,057,402	.....	.....
New Zealand.....	Jan., 1920	23,914,506	Jan., 1919	25,828,554	April, 1914	24,798,763	.....	884,257
South Africa.....	.....	.....	1919	28,491,500	1911	30,656,659	.....	2,165,159
Tunis.....	.....	.....	Feb., 1919	2,661,579	Dec., 1913	728,540	.....	.....
Totals.....	.....	236,251,023	.....	.....	.....	236,243,861	.....	.....
Total increase.....	.....	8,162	or 3.5%	.....	.....	.....	.....	.....
Decrease for all countries.....	.....	11,120,290	.....	.....	.....	.....	.....	.....

Table 20.
SWINE.

Countries	Recent estimates			Before the war			Difference between pre-war and latest estimate	
	Date	Number	Date	Date	Number	Increase	Decrease	
Great Britain.....	June, 1920	2,123,229	June, 1919	June, 1914	2,646,977		533,748	
Ireland.....	June, 1920	980,678	June, 1919	June, 1914	1,405,638		375,560	
France.....	.....	.....	Dec., 1919	Dec., 1913	7,083,850		2,955,290	
Italy.....	.....	.....	April, 1918	Dec., 1914	2,722,000		383,074	
Spain.....	.....	.....	Dec., 1917	Dec., 1915	2,710,185	1,219,264		
Norway.....	.....	.....	June, 1918	Sept., 1914	228,117		18,831	
Sweden.....	.....	.....	June, 1919	Dec., 1913	2,496,706		260,829	
Denmark.....	July, 1920	1,007,861	July, 1919	June, 1914	1,350,204		1,488,845	
Netherlands.....	.....	.....	March, 1919	Dec., 1913	1,412,293		866,519	
Belgium.....	.....	545,774	July, 1919	Dec., 1911	570,226		104,920	
Switzerland.....	.....	14,269,497	April, 1919	Dec., 1913	25,659,140		11,389,643	
Germany.....	Sept., 1920	.....	Sept., 1919	Dec., 1906	1,110,957		189,643	
Portugal.....	March, 1920	921,312	May, 1919	Oct., 1910	1,790,746		971,401	
Czecho-Slovakia.....	.....	.....	.....	.....	.....		.....	
Totals.....	.....	32,857,235	.....	.....	52,016,651		.....	
Total decrease.....	.....	19,159,416	or 36.8%	.....	.....		.....	
Canada.....	.....	.....	.....	.....	.....		.....	
United States.....	June, 1920	3,516,678	June, 1919	June, 1914	3,434,261	82,417		
Argentina.....	Jan., 1921	66,649,000	Jan., 1920	Jan., 1914	58,933,000	7,716,000		
Australia.....	.....	3,227,346	.....	June, 1914	2,900,585	326,761		
New Zealand.....	.....	.....	Dec., 1918	Dec., 1913	800,505	113,397		
South Africa.....	Jan., 1920	259,647	Jan., 1919	April, 1911	348,754		89,107	
Tunis.....	.....	.....	Feb., 1919	Dec., 1913	1,081,600		357,593	
Totals.....	.....	75,308,261	.....	.....	67,516,104			
Total increase.....	.....	7,792,157	or 11.5%	.....	.....			
Decrease for all countries.....	.....	11,367,259	or 9.6%	.....	.....			

The above tables contain the official estimates of the numbers of live stock in all the countries which have furnished figures to the International Institute. Since a number of countries have not yet reported for 1920 a second column has been added, under the heading "recent estimates", in order to give the estimates for the latest date possible. By giving these two columns, an idea of the trend of the live-stock situation during the past year may be obtained.

In Europe the numbers of live stock are still considerably less than before the war, especially in the case of swine. This shortage would be still more marked if figures were available for the Balkan and Central States of Europe. No inkling of the state of live stock in Russia has been received.

During the past year the numbers of live stock in Europe have not increased to any extent. In the United Kingdom there has been a decrease.

Cattle.—On the latest dates for which estimates are available the total number of cattle in the European countries mentioned was 64,151,000 compared with the pre-war total of 73,198,000, a decrease of 9,047,000. In the other countries, however, there were on the latest dates a total of 125,069,000

against 108,013,000 before the war, an increase of 17,055,000. The number of cattle for all the countries mentioned in the table has increased by 8,008,000 since the period before the war, which is not abnormal compared with the increase of population.

During the past year there have been decreases in the number of cattle in the United Kingdom, Canada and the United States.

Sheep.—In the European countries the total number of sheep decreased by 11,128,000 from 87,146,000 before the war to 76,018,000, the recent figures. In the other countries there was an increase of 8,000 from 236,243,000 to 236,251,000. There was a decrease between the two periods of 11,120,000, for all the countries. The number of sheep declined, during the past year, in the United Kingdom and the United States. There was a slight increase in Canada.

Swine.—Between the two periods the number of swine in the European countries decreased by 19,159,000, from 52,017,000 to 38,857,000. In the other countries there was an increase of 7,792,000 from 67,516,000 to 75,308,000. There was, therefore, a total decrease in all the countries given in the table, of 11,367,000. The number of swine decreased during the past year in Canada and the United States.

FOREIGN CROP CONDITIONS

United Kingdom.—The weather was very wet throughout January. On February 1 wheat was in good condition.

France.—At the end of January the new crops looked well, but growth was abnormally forward. Farmers were already preparing for spring sowing, and it is expected that a larger area will be put under crop.

Belgium.—Crops were looking well, and an increased area was planted to wheat.

Italy.—The wheat acreage is reported to be below average. The weather has not been favourable for the new crops.

Spain.—Conditions have been generally favourable, and crops present a good appearance.

Germany.—The condition of the crops was reported as satisfactory early in February. It is asserted that the pre-war outturns of grains cannot be expected while the shortage of fertilizers continues.

North Africa.—Crop prospects were reported as favourable early in February. The wheat acreage in Algeria is small owing to a shortage of seed.

India.—The area sown to wheat is estimated to be about 4,000,000 acres less than last year. Up to February 1 the weather had been very dry and wheat prospects unfavourable.

THE INTERNATIONAL INSTITUTE STATISTICAL BULLETIN (1)

(From the "Price Current-Grain Reporter," Feb. 23, 1921.)

Prof. Thomas H. Hunt of California, United States Delegate to the International Institute of Agriculture at Rome, under date of January 24, sends us the information that the first number of Part I of the "Monthly Bulletin of Statistics" of the Institute has appeared. This bulletin is unique in character. It is devoted entirely to comparative prices of agricultural products which are presented in an unusual form. For example, prices of wheat, rye, barley, oats, corn, rice and cotton in the principal markets of the chief exporting countries are given in terms commonly used in the country concerned. Taking a single instance, New York's quotation for No. 2 red winter wheat on Dec. 3 last is given as \$2.06 $\frac{3}{4}$ per bushel. As dollars mean little to a Frenchman, Italian or German, the Bulletin informs readers of those nationalities that the New York price of No. 2 red winter wheat on the date mentioned was 554.5 marks, 128.12 fr.; 214.38 lire per quintal of 3.67 bush. of 60 lbs. The requisition prices of several governments for domestic wheat also are given in such a manner that the Italian farmer may see that while New York price for hard winter was 214 lire, the price of his home-grown wheat was 117 lire and soft wheat 102 lire. Of special interest to the American farmer are

quotations side by side of No. 2 mixed corn at Chicago and yellow Plate corn at Buenos Aires, prepared in such a manner that the quotations may be readily understood by readers both in the United States and in Buenos Aires as well as in Europe.

The Bulletin gives also the cost of freights to various countries. Incidentally the Bulletin also publishes a graph showing the effect of removal of government control from ocean-going freights.

In addition to publishing 36 bulletins a year in five languages, each month a summary of the statistics of production is sent by wire or wireless to the United States and other countries. Prof. Hunt might have added, what we now know, that the Institute aims to make this service weekly in the near future and perhaps daily. So that Prof. Hunt is entirely justified in saying that the service that is being given by the Institute and will be given by it, as its organization for that purpose is perfected, is altogether a service that cannot be obtained elsewhere in the world and will be at the disposal of those who read any one of the English, French, German, Italian or Spanish languages, and the information will be couched in such terms as any intelligent person can understand.

(1) The Institute Statistical Bulletin in its new form is now being distributed by the Institute Branch, Department of Agriculture. Persons interested in it may have it on application, so long as the supply for distribution is not exhausted.—Editor's note.

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